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PROCEEDINGS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON

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LIST OF FELLOWS

OF THE

ENTOMOLOGICAL SOCIETY OF LONDON.

HONORARY FELLOWS.

Date of Election.

1900 Aurivillius, Professor Christopher, *Stockholm.*

1915 Berlese, Professor Antonio, *via Romana*, 19, *Firenze, Italy.*

1905 Bolivar, Ignacio, *Museo nacional de Historia natural, Hipodromo*, 17, *Madrid.*

1911 Comstock, Prof. J. H., *Cornell University, Ithaca, New York, U.S.A.*

1894 Forel, Professor Auguste, M.D., *Yvorne, Canton de Vaud, Switzerland.*

1925 Gestro, Prof. R., *Direttore del Museo Civico di Storia Naturale, Genova, Italy.*

1926 Horvath, Dr. Geza, *Museum Nationale Hungaricum, Budapest, Hungary.*

1915 ‡ Howard, Dr. L. O., *Chief, Bureau of Entomology, U.S. Dept. of Agriculture, Washington, U.S.A.*

1914 Lameere, Professor A., 74, *rue Defarq, Bruxelles.*

1918 Marchal, Dr. Paul, President of the Entomological Society of France, 45, *rue de Verrières, Antony, Seine, France.*

1913 Tian-Shanski, A. P. Semenoff, *Vassili Ostrov*, 8 *lin.*, 39, *Petrograd, Russia.*

1911 Wasmann, Fr. Erich, S.J., *Valkenburg* (*L.*) *Ignatius Kolleg, Holland.*

SPECIAL LIFE FELLOWS.

Date of Election.

1926 (1891) Frohawk, F. W., *Romney Cottage, Park Hill, Carshalton, Surrey.*

1923 (1889) Johnson, The Rev. W. F., M.A., 2, *The Eyries, Newcastle, Co. Down, Ireland.*

1926 (1890) Newstead, Prof. R., M.Sc., F.R.S., A.L.S., Hon. F.R.H.S., *St. Mary's Cottage*, 67, *Handbridge, Chester.*

1916 (1888) Yerbury, Colonel John W., late R.A., F.Z.S. (Council, 1896, 1903–5), 1, *St. James' Place*, S.W. 1.

FELLOWS.

(The names of those who have not yet paid either the Entrance Fee or the firs year's subscription are not included.)

*Marked * died during the year* 1926.
Marked † have compounded for their Annual Subscriptions.
Marked ‡ have been admitted into the Society (to Dec. 1926).

Date of Election.

1914†‡Adair, E. W., B.A., 34, *Rue de la Garrique, Nimes (Gard), France.*
1913 ‡ Adams, B. G., 15, *Fernshaw-road, Chelsea,* S.W.
1902 ‡ Adkin, B. W., *Trenoweth, Hope-park, Bromley, Kent.*
1885 ‡ Adkin, Robert (V.-Pres., 1922; Council, 1901–2, 1911–13, 1921–3), *Hodeslea, Meads, Eastbourne.*
1921 Alexander, Prof. C. P., *Fernald Hall, Mass. Agricultural College, Amherst, Mass., U.S.A.*
1922 Allen, Donald, *Carlton House, Middleton-street, Llandrindod Wells, Rad.*
1920 ‡ Altson, A. M.
1924 ‡ Amirthalingan, C., 112, *Gower-street,* W.C. 1.
1911 Anderson, T. J., *Entomological Laboratory, Kabete, Kenya Colony.*
1919†‡Andrewes, C. H., *Windy Gap, Merton-lane, Highgate,* N. 6.
1910†‡Andrewes, H. E. (Council, 1920–2), 8, *North-grove, Highgate,* N. 6.
1922 ‡ Andrewes, H. L., *c/o John Heelas, Esq., Queen Anne's Mansions,* S.W.
1899 ‡ Andrews, Henry W., 6, *Footscray-road, Eltham,* S.E. 9.
1901 ‡ Anning, William, 15, *Arthur-street West,* E.C. 4.
1908 † Antram, Charles B., *The Atal Tea Co., Ltd., Siligmi, Darjeeling, India.*
1913 ‡ Armytage, Edward O., *c/o The Westminster Bank, Ltd.,* 25, *Sussex-place,* S.W. 7.
1907 ‡ Arnold, G., D.Sc., A.R.C.S., *Rhodesia Museum, Buluwayo, South Africa.*
1899†‡Arrow, G. J. (Council, 1905–7), 9, *Rossdale-road, Putney,* S.W. 15; and *British Museum (Natural History), Cromwell-road,* S.W. 7.
1922 Arthur, Francis, M.R.C.S., L.R.C.P., 395, *Bethnal Green-road,* E. 2.
1911 ‡ Ashby, E. B., 36, *Bulstrode-road, Hounslow, Middlesex.*
1907†‡Ashby, Sidney R., 37, *Hide-road, Headstone, Harrow.*
1925 Ashworth, J. H., *Walton Fold, Longridge, Preston, Lancs.*
1921 Atkinson, D. J., *Ataran Forest Division, Moulmein, Burma.*
1886 Atmore, E. A., 2a, *New Conduit-street, King's Lynn.*
1914 Awati, P. R.

1922 ‡ Babault, G., 10, *rue Camille-Perier, Chaton, Seine-et-Oise, France.*
1904†‡Bagnall, Richard S., 13, *Scarmouth-terrace, Edinburgh.*
1909 ‡ Bagwell-Purefoy, Capt. Edward, *East Farleigh, Maidstone.*
1903–1913, 1924 :
‡ Baldock, G. R., *Oakburn Villa, Hertford-road, Enfield.*
1916 ‡ Balfour, Miss Alice, 4, *Carlton-gardens,* S.W., and *Whittingehame, Prestonkirk, Scotland.*
1921 ‡ Balfour-Browne, Prof. W. A. F., F.R.S.E., F.Z.S. (Council, 1925–), *Winscombe Court, Winscombe, Somerset.*

1912 ‡ Ballard, Edward, 170, *Bowen-terrace, New Farm, Brisbane, Australia.*
1886 ‡ Bankes, Eustace R., M.A.
1890 Barclay, Francis H., F.G.S., *The Warren, Cromer.*
1925 Barnes, W., M.D., *Decatur, Illinois, U.S.A.*
1902 ‡ Barraud, P. J., *Central Research Institute, Kasauli, Punjab, India.*
1926 Barrington, Miss J., B.A., *St. Leonards School, St. Andrews,* N.B.
1907 ‡ Bartlett, H. Frederick D., *Island of St. Helena, S. Atlantic.*
*1894†‡Bateson, William, M.A., F.R.S., Fellow of St. John's College, Cambridge (Vice-Pres., 1925; Council, 1925–26), *The Manor House, Merton, Surrey.*
1908 Bayford, E. G., 2, *Rockingham-street, Barnsley.*
1912 ‡ Baynes, E. S. A., 44, *Primrose Mans., Battersea-park,* S.W. 11.
1896†‡Beare, Prof. Sir T. Hudson, B.Sc., F.R.S.E. (V.-Pres., 1910; Council, 1909–11, 1925–), 10, *Regent-terrace, Edinburgh.*
1912 Bedford, Gerald, Entomologist to the Union of South Africa, Veterinary Bacteriological Laboratory, *Ondestepoort, Pretoria, Transvaal.*
1913 Bedford, Capt. H. W., *W.T.R. Laboratories, Khartoum, Sudan.*
1899 ‡ Bedwell, Ernest C. (V.-Pres., 1922; Council, 1917–19, 1922–4), *Bruggen, Brighton-road, Coulsdon, Surrey.*
1920 ‡ Beeson, C. F. C., *Indian Forest Service, Forest Research Institute, Dehra Dun, U.P., India.*
1904 Bengtsson, Simon, Ph.D., Lecturer, *University of Lund, Sweden ;* Curator, Entomological Collection of the University.
1915 Benham, Prof. W. B., M.A., D.Sc., F.R.S., *University of Otago, Dunedin, New Zealand.*
1925 ‡ Benson, R. B., B.A., *Boldre House, Berkhamsted, Herts.*
1906 ‡ Bentall, E. E., *The Grove, Witham, Essex.*
1913 ‡ Best-Gardner, Charles C., *Rookwood, Neath, Glamorgan.*
1920 ‡ Bethell, George, F.R.Hist.S., F.L.A.
1885 ‡ Bethune-Baker, George T., F.L.S., F.Z.S. (Pres., 1913–14; V.-Pres., 1910–11, 1915; Council, 1895, 1910–15, 1919–21), 20, *Newbold-terrace, Leamington Spa.*
1891 ‡ Blaber, W. H., F.L.S., 34, *Cromwell-road, Hove, Brighton.*
1920 Blackmore, E. H., Pres. Brit. Columbia Ent. Soc., *P.O. Box* 221, *Victoria, B.C.*
1904 ‡ Blair, Kenneth G., B.Sc. (Council, 1918–20), *Claremont,* 120, *Sunningfields-road, Hendon,* N.W. 4.
1921 Blenkarn, S. A., 44, *Rannock Lodge, Grovelands-road, Purley, Surrey.*
1904 ‡ Bliss, M. F., M.C., M.R.C.S., L.R.C.P., *Branston, near Rugby.*
1912 Bodkin, G. E., Govt. Entomologist, *Mount Carmel, Haifa, Palestine.*
1903 Bogue, W. A., 34, *Handen-road, Lee,* S.E. 12.
1921 ‡ Bolton-King, E., *Balliol College, Oxford.*
1902 ‡ Bostock, E. D., *Oulton Cross, Stone, Staffs.*
1921 Bouck, Baron J., *Springfield, South Godstone, Surrey.*
1913 Bowater, Lt.-Col. William, 23, *Highfield-road, Edgbaston, Birmingham.*
1894 † Bowles, E. Augustus, M.A., *Myddelton House, Waltham Cross.*
1912 † Bowring, C. Talbot, *Flat* 2, 9, *Fourth-avenue, Hove.*
1921 ‡ Box, H. E., *Central Aguirre Sugar Co., Central Aguirre, Porto Rico.*

1919 ‡ Box, L. A., 35, *Great James-street*, W.C. 1.
1910 Boyd, A. Whitworth, *Frandley House, nr. Northwich.*
1920 Boyd, Major J. E. M., M.C., R.A.M.C., c/o Messrs. Glyn Mills & Co. (Holts Branch), 3, *Whitehall Place*, S.W.
1905 Bracken, Charles W., B.A., 8, *De la Hay Villas, Plymouth.*
1919 Bradley, Prof. J. Chester, M.Sc., Professor of Entomology and Curator of Invertebrate Zoology, *Cornell University, Ithaca, New York, U.S.A.*
1920 ‡ Brenchley, Dr. Winifred E., D.Sc., F.L.S., *Rothamsted Experimental Station, Harpenden, Herts.*
1894 ‡ Bright, P. M., *Colebrook Grange*, 58, *Christchurch-road, Bournemouth.*
1924 ‡ Brindley, Mrs. M. E., 25, *Madingley-road, Cambridge.*
1923 Britten, G., *Riwaka, Nelson, N.Z.*
1909 Britten, Harry, 22, *Birch-grove, Levenshulme, Manchester.*
1925 ‡ Brooks, C. J., 5, *Little Russell-street*, W.C. 1.
1902 ‡ Broughton, Lt.-Col. T. D., R.E., *Cheena Hall, Naini Tal, India.*
1919 Brown, J. M., B.Sc., F.L.S., 176, *Carterknowle-road, Millhouses, Sheffield.*
1910 Browne, H. B., M.A., *Kenilworth, Scatcherd-lane, Morley, Yorks.*
1909 Bryant, Gilbert E., 163, *Gloucester-terrace, Hyde Park*, W. 2.
1898 † Buchan-Hepburn, Sir Archibald, Bart., J.P., D.L., *Smeaton-Hepburn, Prestonkirk.*
1919 ‡ Buckhurst, A. S., *Pathological Laboratory, Milton Road, Harpenden.*
1917 ‡ Buckley, G. C., M.D., F.S.A., *Rye Croft South, Manchester-road, Bury, Lancs.*
1925 ‡ Bull, G. V., B.A., M.B., *Whitegables, Sandhurst, Kent.*
1907 Bulleid, Arthur, F.S.A., *Dimboro, Midsomer Norton, Somersetshire.*
1922 Burns, A. N., Sugar Experiment Station, *Meringa*, via *Cairns, N. Queensland, Australia.*
1896†‡Burr, Malcolm, D.Sc., F.G.S., A.R.S.M. (V.-Pres., 1912; Council, 1903–4, 1910–12), *United Univ. Club, Pall Mall East*, S.W. 1; *Trans. to :— Moscow*, Petrovskaia Agric. Academy, Prof. V. F. Boldyrev.
1920 Burras, A. E., 3, *Connaught-road, North End, Portsmouth.*
1909 ‡ Burrows, The Rev. C. R. N., *The Vicarage, Mucking, Stanford-le-Hope, Essex.*
1922 ‡ Bushby, L. C., 11, *Park-grove, Bromley, Kent.*
1920 ‡ Bushell, Capt. H. S., *Ravensholt, Harrow-on-the-Hill.*
1922 Butler, A. E., *c/o Westminster Bank, Ltd., Clevedon, Somerset.*
1914 † Butterfield, R., Curator, *Corporation Museum, Keighley, Yorks.*
1912†‡Buxton, P. A., M.B.O.U. (Council, 1926–), *Grit Howe, Gerrard's Cross, Bucks.*

1902 ‡ Cameron, Malcolm, M.B., R.N. (Council, 1919–20), 15, *Teesdale-road, Leytonstone*, E. 11.
1913 ‡ Cameron, W. P. L., *Gezira Research Farm, Wad Medani, Blue Nile Province, Sudan.*
1923 ‡ Campbell-Taylor, J. E., *Mavisthorne, Southover, Lewes, Sussex.*
1910 Carlier, E. Wace, M.D., F.R.S.E., *Morningside, Granville-road, Dorridge,* and *The University, Birmingham.*
1924 ‡ Carlier, S. E. Wace, *Morningside, Dorridge, Warwickshire.*
1892 ‡ Carpenter, The Hon. Mrs. Beatrice, 22, *Grosvenor-road*, S.W. 1.

1919 Carpenter, C. F. G.

1910†‡Carpenter, G. D. Hale, D.M., M.B.E. (*East African Medical Service*), *Entebbe, Uganda.*

1895 ‡ Carpenter, George H., D.Sc., M.R.I.A., *The Manchester Museum, The University of Manchester.*

1915 Carr, Professor John Wesley, M.A., F.L.S., F.G.S., Professor of Biology, *University College, Nottingham.*

*1923 Carter, A. E. J., *Hillgarth, Currie, Midlothian.*

1912 Carter, H. F., *The Bacteriological Institute, Colombo, Ceylon.*

1906 ‡ Carter, H. J., B.A., *Garrawillah, Kintore-street, Wahroonga, Sydney, N.S.W.*

1921 Cassels, O. C., D.F.C., N.D.A.

1921 Castle, Miss Amy, *Dominion Museum, Wellington, New Zealand.*

1921 ‡ Cator, Douglas, 13, *Westminster-mansions, Gt. Smith-street,* S.W. 1.

1889†‡Cave, Charles J. P.

1920 ‡ le Cerf, F., Curator of Lepidoptera in the Paris Museum, 13, *rue Guy de la Brosse, Paris.*

1900 Chamberlain, the Rt. Hon. Neville, *Westbourne, Edgbaston, Birmingham.*

1871 ‡ Champion, George C., F.Z.S., A.L.S. (Vice-Pres., 1925; Librarian, 1891–1920; Council, 1875–7, 1921, 1924–6), *Bromhall-road, Horsell, Woking;* and 45, *Pont-street,* S.W. 1.

1914 ‡ Champion, H. G., M.A., *Forest Research Institute, Dehra Dun, U.P., India.*

1913 Chasen, F. W., M.B.O.U., *Raffles Museum, Singapore.*

1919 Chatterjee, N. C., B.Sc., *Forest Research Institute, Dehra Dun, U.P., India.*

1923 Chatterjee, S. N., *Forest Research Inst., Dehra Dun, U.P., India.*

1897 ‡ Chawner, Miss Ethel F., *Forest Bank, Lyndhurst S.O., Hants.*

1913 ‡ Cheavin, W. H. S., F.C.S., F.R.M.S., 19, *Rosendale-road, W. Dulwich,* S.E. 21.

1919 Cheesman, Miss L. Evelyn, 20, *Maitland Park Villas, Hampstead,* N.W.

1920 ‡ Cheetham, C. A., *Stone Bridge Mills, Wortley, Leeds.*

1889 Christy, William M., M.A., F.L.S., *Watergate, Emsworth.*

1909 Clark, Lt.-Col. C. Turner, F.Z.S., *The Hutch, Shirley Warren, Southampton.*

1923 Clarke, C. E., 35, *Octagon, Dunedin, N.Z.*

1914 Cleare, L. D., *Dept. of Science and Agriculture, Georgetown, British Guiana.*

1922 Clutten, Wm. George, 136, *Coal Clough-lane, Burnley.*

1908 Clutterbuck, Charles G., *Heathside,* 23, *Heathville-road, Gloucester.*

1908 Clutterbuck, Sir Peter, *c/o The Oriental Club,* 18, *Hanover-square,* W. 1.

1904 ‡ Cockayne, E. A., M.A., M.D., F.R.C.P. (Council, 1915–17, 1926–), 116, *Westbourne-terrace,* W. 2.

1920 Cockcroft, T., 111, *Owen-street, Wellington South, New Zealand.*

1917 ‡ Cockerell, Prof. T. D. A., *University of Colorado, Boulder, Colorado, U.S.A.*

1917 ‡ Cocks, Frederick, 42, *Crown-street, Reading.*

1914 Coleman, Leslie C., Dept. of Agriculture, *Bangalore, Mysore, India.*

1922 ‡ Collenette, C. L., *Gothic Lodge, Woodford Green, Essex.*

1899 ‡ Collin, James, E. (V.-Pres., 1913, 1923; Council, 1904–6, 1913–15, 1923–5), *Sussex Lodge, Newmarket.*

1918 Comstock, Dr. J. A., Director, South-Western Museum, *Marmion-way and avenue, Los Angeles, California, U.S.A.*

1919 ‡ Constable, Miss Florence B., *Datcha, Hookwood, Horley, Surrey.*
1924 ‡ Cooke, Brig.-Genl. B. H., C.M.G., C.B.E., D.S.O., *Inniscrone, Datchet, Bucks.*
1921 Coote, F. D., 71, *Fenchurch-street,* E.C. 3.
1924 Corbett, G. H., 576, *Gardens Hill, Kuala Lumpur, F.M.S.*
1916 Cornford, The Rev. Bruce, 13, *Havelock-road, Portsmouth.*
1921 Corporaal, J. B., "*Natura Artis Magistra,*" *Amsterdam, Holland.*
1924 Cott, H. B., 9, *Old Orchard-road, Eastbourne.*
1923 Cottam, R., *Entomological Dept., Wellcome Tropical Research Laboratory, Khartoum, Sudan.*
1920 ‡ Cotterell, G. S., *Newlyn, Gerrard's Cross, Bucks.*
1913 Coward, T. A., F.Z.S., 36, *George-street, Manchester.*
1923 ‡ Cox, L. G., 9, *Chichester-terrace, Brighton.*
1920 ‡ Crabbe, E., 52, *Sarsfield-road, Balham,* S.W. 12.
1895 Crabtree, B. H., *Holly Bank, Alderley Edge, Cheshire.*
1919 Crampton, Prof. G. Chester, *Massachusetts Agricultural College, Amherst, Mass., U.S.A.*
1922 ‡ Crawford, Wm. Monod, B.A., *Orissa, Marlborough-park, Belfast.*
1909 ‡ Crawley, W. C., B.A., F.R.M.S. (Council, 1917–19), 29, *Holland Park-road,* W. 14.
1907 ‡ Croft, E. Octavius, M.D., 12, *North Hill-road, Headingley, Leeds.*
1919 ‡ Cumming, B. D., *Whistman's Wood, West Clandon, Surrey.*
1908 Curtis, W. P., *Drake North, Sandringham-road, Parkstone, Dorset.*

1911 Davey, H. W., *Cobungua,* 19, *Moama-road, E. Malvern, Australia.*
1913 ‡ Davidson, James, D.Sc., F.L.S. (Council, 1922–4), *Institute of Plant Pathology, Rothamsted, Harpenden, Herts.*
1912 Davis, F. L., J.P., M.R.C.S., L.R.C.P., *Corozal, British Honduras.*
1910 ‡ Dawson, W. G., *Beechwood,* 11a, *Oaklands-road, Bromley, Kent.*
1903 Day, F. H., 26, *Currock-terrace, Carlisle.*
1898 Day, G. O., *Sahlatston, Duncan's Station, Vancouver Island, British Columbia.*
1923 Dean, J. D., *Colin, Llandaff, Glam.*
1923 Dewar, D. A., M.B., C.M., *Altyre House, Stanley, S.O., Co. Durham.*
1917 ‡ Dicksee, Arthur, 24, *Lyford-road, Wandsworth Common,* S.W. 18.
1925 Digges, Rev. J. G., M.A., *Glooncahir, Mohill, Co. Leitrim, Ireland.*
1887 ‡ Dixey, Frederick Augustus, M.A., M.D., F.R.S., Fellow and Bursar of Wadham College (Pres., 1909–10; V.-Pres., 1904–5, 1911; Council 1895, 1904–6), *Wadham College, Oxford.*
1921 Dobson, H. W., 14, *Finkle-street, Kendal.*
1909 † Dobson, Thomas, 33, *The Park, Sharples, Bolton.*
1905 Dodd, Frederick P., *Kuranda, viâ Cairns, Queensland.*
1912 ‡ Doig, Major K. A. C., R.A.M.C., M.R.C.S., L.R.C.P., *Karunders Estate, P.O. Nyeri, Kenya Colony.*
1891 ‡ Donisthorpe, Horace St. John K., F.Z.S. (V.-Pres., 1911; Council, 1899–1901, 1910–12), *Durandesthorpe,* 19, *Hazelwell-road, Putney,* S.W. 15.
1921 Dover, C., *c/o F.M.S. Museum, Kuala Lumpur, F.M.S.*
1913 ‡ Dow, Walter James, 5, *Great College-street, Westminster,* S.W. 1.
1910 Downes-Shaw, Rev. Archibald, *Scotton Rectory, Gainsborough.*

1924 ‡ Druitt, Alan, *Willow Lodge, Christchurch, Hants.*
1900 Drury, W. D., *Stepaside*, 50, *St. Helen's Park-road, Hastings.*
1921 du Porte, E. M., *Macdonald College, Quebec, Canada.*
1894 Dudgeon, G. C., C.B.E., 182, *Cromwell-road*, S.W. 7.
1913 Duffield, C. A. W., *Pickersden, Brook Ashford, Kent.*
1906 ‡ Dukinfield Jones, E., *Box* 1831, *Mountain-street, Glendale, California, U.S.A.*
1883 ‡ Durrant, John Hartley (V.-Pres., 1912–13; Council, 1911–13, 1919–21), 20, *Burstock-road, Putney*, S.W. 15; and *British Museum* (*Natural History*), *Cromwell-road, S. Kensington*, S.W. 7.
1924 Dutt, A., B.A., B.Sc., *Asst. Entomologist, Rustam, Dept. of Agriculture, Baghdad* (*Iraq*).

1910 ‡ Eales-White, Capt. J. C., F.Z.S., 13, *The Hermitage, Richmond, Surrey.*
1912 ‡ Earl, Herbert L., M.A., *Vanessa, Rawlyn-road, Torquay.*
1924 Eastham, L., M.Sc., *Zoology Dept., The University, Birmingham.*
1890–1914, 1922 :
Eastwood, John E., 14, *Chichester-terrace, Brighton.*
1865 ‡ Eaton, The Rev. Alfred Edwin, M.A. (Council, 1877–9), *Richmond Villa, Northam S.O., N. Devon.*
1902 ‡ Edelsten, H. M. (Council, 1926–), *Hillside, Lingfield, Sussex.*
1919 Edwardes, Rev. Tickner, *Folkington Rectory, Polegate, Sussex.*
1911 ‡ Edwards, F. W., 56, *Norton-road, Letchworth.*
1886 Edwards, James, *Colesborne S.O., Glos.*
1884 ‡ Edwards, Stanley, F.L.S., F.Z.S. (Council, 1912–14), 15, *St. Germans-place, Blackheath*, S.E. 3.
1913 Edwards, W. H., *Natural History Dept., The Museum, Birmingham.*
1924 ‡ Edwards, W. H., *Dept. of Agriculture, Reduit, Mauritius.*
1916 ‡ Efflatoun, Bey Hassan, 38, *Shoubrah-avenue, Cairo, Egypt.*
1900 ‡ Elliott, E. A., 41, *Chapel Park-road, St. Leonards-on-Sea.*
1924 Ellis, E. T., F.R.H.S., *Westwood, Ecclesall, Sheffield.*
1900 ‡ Ellis, H. Willoughby, F.Z.S. (Vice-Pres., 1924; Council, 1916–18, 1922–4), *Speldhurst Close, Sevenoaks, Kent*, and *Junior Carlton Club, Pall Mall*, S.W. 1.
1919 Elston, Albert H., 189, *Wattle-street, Malvern, S. Australia.*
1925 Elton, C. S., B.A., *Dept. of Comp. Anatomy, University Museum Oxford.*
1903 ‡ Eltringham, Harry, M.A., D.Sc., F.Z.S., Vice-President (Secretary, 1922–5; V.-Pres., 1914, 1918; Council, 1913–15, 1918–20, 1926–), *Woodhouse, Stroud, Gloucestershire*, and *Hope Department, University Museum, Oxford.*
1908 Eustace, E. M., M.A., *Wellington College, Berks.*
1926 Evans, Col. G. H., C.I.E., C.B.E., *c/o National Bank of India, Ltd.*, 26, *Bishopsgate*, E.C. 2.
1922 Evans, H. Silvester, M.R.C.S., *Lomaloma, Fiji.*
1919 ‡ Evans, Col. W. H., D.S.O., *c/o Lloyd's Bank* (*Cox & Co., R.E. Dept.*), 6, *Pall Mall*, S.W. 1.

1919 ‡ Falconer, William, 12, *King-street., Waterloo, Liverpool.*
1924 ‡ Farmiloe, C., *c/o T. & W. Farmiloe, Ltd., Rochester-row, Westminster*, S.W.

1925 Fassnidge, W., 47, *Tennyson-road, Southampton.*
1926 Faz, A., 714, *Calle Bandera, Santiago, Chili.*
1907 Feather, Walter, *Cross Hills, nr. Keighley, Yorks.*
1900 ‡ Feltham, H. L. L., *Mercantile Buildings, Summonds-street, Johannesburg, Transvaal.*
1920 Fenton, E. W., M.A., B.Sc., *Seale-Hayne Agricultural College, Newton Abbot, Devon.*
1918 ‡ Ferguson, A., 433, *Kilmarnock-road, Newlands, Glasgow.*
1922 Fernald, H. T., Ph.D., *Mass., Agricultural Coll., Amherst, Mass., U.S.A.*
1898 ‡ Fletcher, Prof. T. Bainbrigge, R.N., *Agricultural Research Institute, Pusa, Bihar, India.*
1883 † Fletcher, William Holland B., M.A., *Aldwick Manor, Bognor.*
1905 Floersheim, Cecil, 16, *Kensington Court Mansions,* S.W. 8.
1922 Flower, Miss A. B., *Furzelee, Hale, nr. Salisbury.*
1924 ‡ Ford, E. B., *Wadham College, Oxford.*
1914 Fordham, W. J., M.R.C.S., L.R.C.P., D.Ph., *Whinney House, Low Fell, Gateshead.*
1913 Foster, Arthur H., M.R.C.S., L.R.C.P.(Eng.), M.B.O.U., 13, *Tilehouse-street, Hitchin, Herts.*
1898 ‡ Fountaine, Miss Margaret E., *The Studio,* 100a, *Fellows-road, Hampstead,* N.W. 3.
1921 Fox, C. L., 1621, *Vallejo-street, San Francisco, California, U.S.A.*
1920 ‡ Fox-Wilson, G., *Entomological Dept., R.H.S. Laboratory, Wisley, Ripley, Surrey.*
1908 Fraser, F. C., Major, M.D., I.M.S., *c/o Bombay Nat. Hist. Soc.,* 6, *Apollo-street, Bombay, India.*
1888 ‡ Fremlin, H. Stuart, M.R.C.S., L.R.C.P., *Govt. Lymph Establishment, Colindale-avenue, The Hyde,* N.W. 9.
1910 ‡ Frisby, G. E., 29, *Darnley-road, Gravesend.*
1907 ‡ Fryer, J. C. F., M.A. (Council, 1916–18, 1925–), *Milton-road, Harpenden, Herts.*
1876 ‡ Fuller, The Rev. Alfred, M.A., *The Lodge,* 7, *Sydenham-hill, Sydenham,* S.E. 26.

1887 ‡ Gahan, Charles Joseph, M.A., D.Sc. (Pres., 1917–18; V.-Pres., 1916, 1919; Sec., 1899–1900; Council, 1893–5, 1901, 1914–16, 1919), 8, *Lonsdale-road, Bedford Park,* W. 4.
1920 Gardner, J. C. M., *Forest Research Inst., Dehra Dun, U.P., India.*
1901 †‡ Gardner, Willoughby, F.L.S., F.S.A., *Deganwy, N. Wales.*
1923 Garrett, F. C., *West Croft, Hexham.*
1922 ‡ Gater, B. A. R., B.A., F.R.M.S., *Dept. of Agriculture, Kuala Lumpur, F.M.S.*
1920 Gauntlett, H. L., M.R.C.S., L.R.C.P., A.K.C., *Van Buren, De Lisle-road, Bournemouth.*
1913 ‡ de Gaye, J. A., 35, *Perham-road, W. Kensington,* W. 14.
1919 ‡ Gedye, A. F. J., *P.O. Box* 216, *Nairobi, Kenya Colony.*
1923 Gee, G. F., *Springside, Mouldsworth, nr. Chester.*

1922 Ghosh, C. C., B.A., *Agricultural College, Mandalay, Burma, India.*
1915 ‡ Gibson, Arthur, *Dominion Entomologist, Dept. of Agriculture, Ottawa, Canada.*
1908 Giffard, Walter, M., *P.O. Box* 300, *Honolulu, Hawaii.*
1895 Gilbert-Carter, Sir G. T., K.C.M.G., *c/o Cox, Biddulph & Co.*, 43, *Charing Cross*, S.W.
1907 Giles, H. M., 184, *Bennett-street, East Perth, W. Australia.*
1904 ‡ Gilliat, Francis, B.A., 25, *Manor-road, Folkestone.*
1925 Gilles, W. S., F.I.C., F.C.S., *The Cottage, Bocking, Braintree, Essex.*
1919 ‡ Gimingham, C. T., O.B.E., F.I.C., *Rothamsted Experimental Station, Harpenden, Herts.*
1921 Glick, P. A., *U.S. Dept. of Agriculture, Tallulah, Louisiana, U.S.A.*
1914 ‡ Godfrey, E. J., Education Dept., *Bangkok, Siam.*
1924 Golding, F. D., *Moor Plantation, Ibadan, S. Provinces, Nigeria.*
1920 ‡ Goodban, B. S., *Watersmeet, West-street, Ewell, Epsom, Surrey.*
1921 ‡ Goodman, O. R., "*Hatchgate,*" *Massetts-road, Horley, Surrey.*
1904 Goodwin, Edward, *Canon Court, Wateringbury, Kent.*
1925 ‡ Gordon, D. J., B.A., *Craigellachie House, Strathpeffer, N.B.*
1898 ‡ Gordon, J. G. McH., *Corsemalzie, Whauphill S.O., Wigtownshire.*
1898 ‡ Gordon, R. S. G. McH., *Drumblair, Inverness.*
1909 Gowdey, Carlton C., B.Sc., *Govt. Laboratory, Hope, Kingston P.O., Jamaica.*
*1918 ‡ Grace, G., B.Sc., A.R.C.Sc., 23, *Alexander-crescent, Ilkley, Yorks.*
1924 Grant, J. H., *Cole Dale View, Coleshill-road, Ward End, Birmingham.*
1914 Graveley, F. H., *The Indian Museum, Calcutta.*
1911 ‡ Graves, P. P., 5, *Hereford-square*, S.W. 7.
1891†‡Green, E. Ernest, F.Z.S. (Pres., 1923–4; V.-Pres., 1915, 1925; Council, 1914–16, 1925), *Way's End, Beech-avenue, Camberley.*
1922 Greening, Linnaeus, F.L.S., F.Z.S., 33, *Wilson Patten-street, Warrington.*
1893 † Greenwood, H. P., F.L.S., *Whitsbury House, Salisbury.*
1921 Greenwood, W. F. N., *C.S.R. Co., Lautoka, Fiji.*
1926 ‡ Grey, Mrs. O., 90, *Charing Cross-road*, W.C. 2.
1894 ‡ Grimshaw, Percy H., *Royal Scottish Museum, Edinburgh.*
1905 Grist, Charles J., *The Croft, Carol Green, Berkswill, Coventry.*
1920 ‡ Grosvenor, T. H. L., *Springvale, Linkfield-lane, Redhill, Surrey.*
1920 ‡ Gunton, Major H. C., 1, *The Highway, Gerrard's Cross, Bucks.*
1906 Gurney, Gerard H., *Keswick Hall, Norwich.*
1910 Gurney, William B., Govt. Entomologist, *Department of Agriculture, Sydney, Australia.*

1912 Hacker, Henry, *Queensland Museum, Brisbane, Queensland.*
1919 Hadwen, Dr. Seymour, D.Vet.Sci., *Univ. of Saskatchewan, Saskatoon, Canada.*
1925 ‡ Haig-Thomas, P., *The Grange, Goring-on-Thames.*
1906 ‡ Hall, Arthur, "*Bowness,*" *Brighton-road, Purley, Surrey.*
1924 Hall, J.C., *Shaldon, Upper Park-road, Bromley, Kent.*
1885 ‡ Hall, T. W., *Wood Grange, Shire-lane, Chorley Wood, Herts.*
1921 ‡ Hall, W. J., *The B.S.A. Co's Citrus Estate, Mazoe, Southern Rhodesia.*

1912 Hallett, H. M., 64, *Westbourne-road, Penarth, Glamorganshire.*
1923 ‡ Halliwell, A. C., *St. Thomas's Hospital, Westminster,* S.W.
1915 Hamm, A. H., F.L.S., 22, *Southfield-road, Oxford.*
1891 ‡ Hanbury, Frederick J., F.L.S., *Brockhurst, E. Grinstead.*
1923 ‡ Hancock, G. L. R., *Dept. of Agriculture, Box* 5, *Kampala, Uganda ; Trans. to :—Byfleet Rectory, Surrey.*
*1905 ‡ Hancock, Joseph L., 5454, *University-avenue, Chicago, U.S.A.*
1923 Handley, G., 54, *All Saints'-road, King's Heath, Birmingham.*
1917 Harding, W. G., F.L.S., M.R.S.L., F.R.H.S., 22, *Arran-road,* S.E. 6.
1903 ‡ Hare, E. J., 4, *New-square, Lincoln's Inn,* W.C. 2.
1920 ‡ Hargreaves, E., *Lands and Forest Dept., Freetown, Sierra Leone.*
1920 Hargreaves, H., *The Lindens, Kennington, Ashford, Kent.*
1926 Harmsworth, H. A. B., 3, *Marlborough Gate, Hyde Park,* W. 2.
1921 Harland, S. C., D.Sc., *Imperial College of Tropical Agriculture, Trinidad,* B.W.I.
1926 Harris, R. H., *P.O. Empangeni, Zululand, S. Africa.*
1925 Harukawa, C., *Ohara Institute, Kurashiki, Okayama-Ken, Japan.*
1910 ‡ Harwood, Philip, *c/o Westminster Bank, Ltd.,* 92, *Wimborne-road, Winton, Bournemouth.*
1926 Hatch, Melville H., *Dept. of Animal Biology, Univ. of Minnesota, Minneapolis, Minn., U.S.A.*
1919 ‡ Hawker-Smith, W., *Benares, Wormley, Godalming, Surrey.*
1913†‡Hawkshaw, Oliver, *Holly Combe, Liphook, Hants.*
1924 Hayward, A. R., *Misterton, Somerset.*
1919 ‡ Hayward, H. C., M.A., *Repton, Derby.*
1921 ‡ Hayward, Capt. K. J., *The Vicarage, Bruton, Somerset.*
1910 ‡ van der Hedges, Alfred, *Overstone-court, Overstone, Northants.*
1919 ‡ Hemming, Capt. A. F., C.B.E., F.Z.S., 25, *Scarsdale Villas,* W. 8.
1910 Henderson, J., *c/o Messrs. Osborne & Chappel, Ipoh, Perak, Federated Malay States.*
1918 Herrod-Hempsall, J., *Orchard House, Stockingstone-road, Luton, Beds.*
1903 Herrod-Hempsall, W., *W.B.C. Apiary, Old Bedford-road, Luton, Beds.*
1925 Hesse, Dr. A. T., *South African Museum, Cape Town, S. Africa.*
1913 Hewitt, John, B.A., Director, *Albany Museum, Grahamstown, S. Africa.*
1923 Hicks, J. B., 99, *Barkston-gardens, S. Kensington,* S.W.
1922 ‡ Higgins, L. G., M.A., F.R.C.S., *Heatherside, Woking, Surrey.*
1924 Hingston, Major R. W. G., *c/o Lloyds Bank, Ltd.,* 6, *Pall Mall,* S.W. 1.
1907 ‡ Hoar, T. F. P., *Hillside, Verulam-road, St. Albans, Herts.*
1914 Hodge, The Rev. Canon E. Grose, *Halfacre, Heathside Park-road, Woking.*
1912 Hodge, Harold, 99, *Highbury-place,* N. 5.
1888 Hodson, The Rev. J. H., B.A., B.D., *Rhyddington, Clifton Drive, Lytham.*
1922 Hogarth, A. Moore, 8, *Brentmead-place, Golders Green,* N.W.
1925 Holdaway, F. G., *Zoology Dept., The University, Adelaide, S. Australia.*
1902 Hole, R. S., *c/o Messrs. H. S. King and Co.,* 9, *Pall Mall,* S.W.
1910 Holford, H. O., *Elstead Lodge, Goldalming, Surrey.*
1887 Holland, The Rev. W. J., D.D., Ph.D., Director Emeritus, *Carnegie Museum, Pittsburgh, Penn, U.S.A.*
1898 ‡ Holman-Hunt, C. B., *Great Toller, nr. Dorchester, Dorset.*

1922 ‡ Hopkins, G. H. E., *Shevington Vicarage, Gathurst, nr. Wigan, Lancs.*
1921 Hopper, L. B., *Manor House, Penryn, Cornwall.*
1919 de Horrack-Fournier, Mme., 90, *Boulevard Malesherbes, Paris,* and *Château de Voisins, Louveciennes, Seine-et-Oise, France.*
1907 † Howard, C. W., *Canton Christian College, Canton, China.*
1888 Hudson, G. V., *Hill View, Karori, Wellington, New Zealand.*
1907 Hughes, C. N., 78, *Harley House,* N.W. 1.
1921 Hunt, Rev. T. Wesley, *Mission House, Bukoba, Tanganyika Terr., E. Africa.*
1917 Hunter, David, M.A., M.B., *The Coppice, Nottingham.*
1922 ‡ Hutchinson, G. E., *Aysthorpe, Newton-road, Cambridge.*
1923 Hutchinson, J. H., M.A., *Holly House, Littlebourne, nr. Canterbury.*

1897 ‡ Image, Prof. Selwyn, M.A. (Council, 1909–11), 78, *Parkhurst-road, Camden-road,* N. 7.
1912†‡Imms, A. D., D.Sc., M.A., F.L.S. (V.-Pres., 1920; Council, 1919–21), *Rothamsted Experimental Station, Harpenden, Herts.*
1920 Inglis, C. M., F.Z.S., M.B.O.U., *Baghownie Factory, Laheria Sarai, Bihar, India.*
1918 Isaacs, P. V., B.A., B.Sc., *Agricultural Research Inst., Pusa, Bihar, India.*

1917 ‡ Jackson, Miss Dorothy J., *North Cliff, St. Andrews, Fife.*
1922 ‡ Jackson, W. H., 14, *Woodcote Valley-road, Purley, Surrey.*
1920 James, Russell, 7, *Broadlands-road, Highgate,* N. 6.
1914 ‡ Janse, A. J. T., 1*st-street, Gezina, Pretoria, S. Africa.*
*1869 ‡ Janson, Oliver E., 44, *Great Russell-street, Bloomsbury,* W.C. 1; and *Cestria, Claremont-road, Highgate,* N. 6.
1898 Janson, Oliver J., 13, *Fairfax-road, Hornsey,* N.
1919 ‡ Jeans, Miss Gertrude M., *Penn Court,* 54, *Cromwell-raod,* S.W. 7.
1909 Jepson, Frank P., M.A., *Dept. of Agriculture, Peradeniya, Ceylon.*
1886 John, Evan, *Llantrisant S.O., Glamorganshire.*
1907 Johnson, C. F., *West Bank, Didsbury-road, Heaton Mersey.*
1924 ‡ Johnston, H. B., M.A., *Wellcome Laboratory, Khartoum, Sudan.*
1920 ‡ Johnstone, Douglas, *Brooklands, Rayleigh, Essex.*
1908 ‡ Joicey, J. J., F.L.S., F.Z.S., F.R.G.S., etc. (Council, 1921–3), *The Hill, Witley, Surrey.*
1924 Jones, F. M., 2000, *Riverview Avenue, Wilmington, Delaware, U.S.A.*
1920 ‡ Jones, Rev. Neville, *Hope Fountain, Box* 283, *Buluwayo, Rhodesia, S. Africa.*
1924 Jones, W. E., *M'fongosi, Zululand.*
1894†‡Jordan, Dr. K., Vice-President (V.-Pres., 1909; Council, 1909–11, 1924–6), *The Museum, Tring.*
1910 ‡ Joseph, E. G., 23, *Clanricarde-gardens,* W. 2.
1910 ‡ Joy, E. C., *Moore's Hotel, The Leas, Folkestone.*
1902 ‡ Joy, Norman H., M.R.C.S., L.R.C.P., 78, *Crescent-road, Reading.*
1919 Jurriaanse, J. H., *W.Z. Schickade,* 75, *Rotterdam, Holland.*

1896†‡Kaye, W. J. (Council, 1906–8), *Caracas, Ditton-hill, Surbiton.*
1925 Kearns, H. G. H., B.Sc., *Dept. of Zoology, The University, Bristol.*

1926 Kelly, R., 59, *Swanston-street, Melbourne, Victoria, Aus.*
1926 Kennedy, Prof. C. H., *Ohio State Univ., Columbus, Ohio, U.S.A.*
1890 ‡ Kenrick, Sir George H., *Whetstone, Somerset-road, Edgbaston, Birmingham.*
1920 Kent-Lemon, Capt. Arthur Leslie, York & Lancaster Regt., *c/o Postmaster, Khartoum, Sudan,* and *Blytheswood, Ascot, Berks.*
1904 Kershaw, G. Bertram, *Ingleside, West Wickham, Kent.*
1906 Keynes, John Neville, M.A., D.Sc., 6, *Harvey-road, Cambridge.*
1900 Keys, James H., 7, *Whimple-street, Plymouth.*
1919 Khare, J. L., *Agricultural College, Nagpur, India.*
1925 Killington, F. J., A.C.P., 177, *Leigh-road, Eastleigh, Hants.*
1889 ‡ King, James, J. F.-X., 1, *Athole Gardens-terrace, Kelvinside, Glasgow.*
1912 ‡ King, H. H., Govt. Entomologist, *Gordon College, Khartoum, Sudan.*
1917 ‡ Kirkpatrick, T. W., *Dept. of Agriculture, Nairobi, Kenya Colony.*
1887 † Klein, Sydney, T., F.L.S., F.R.A.S., *Lilly's, Chelsfield, Kent.*
1920 Knight, V., *Fairgreen Cottage, Glemsford, Suffolk.*

1922 ‡ Lacey, Lionel, *Brooklyn, Solihull, Warwickshire.*
1925 Laidlaw, F. F., M.R.C.S., L.R.C.P., *Hyefield, Uffculme, Devon.*
1916 ‡ Laing, Frederick (Council, 1922–4), *Natural History Museum, Cromwell road,* S.W. 7.
1910 ‡ Lakin, C. Ernest, M.D., F.R.C.S., 105, *Harley-street,* W. 1.
1924 Lamb, C. G., M.A., Sc.D., 65, *Glisson-road, Cambridge.*
1911†‡Lamborn, W. A., M.R.C.S., L.R.C.P., *c/o W. S. Tomkinson, Esq., North Hinksey, Oxon.*
1917 Langham, Sir Charles, Bart., *Tempo Manor, Co. Fermanagh.*
1922 Lankester, C. H., *Cartago, Costa Rica.*
1920 Lathy, Percy I., 90, *Boulevard Malesherbes, Paris.*
1916 Latta, Prof. Robert, D.Phil., c/o *University Library, Glasgow.*
1925 Latter, M. P., F.G.S., *Weald Place, Sevenoaks, Kent.*
1895 Latter, Oswald H., M.A., *Charterhouse, Godalming.*
1899 Lea, Arthur M., Government Entomologist, *Museum, Adelaide, S. Australia.*
1923 ‡ Lean, O. B., *The Moor Plantation, Ibadan, Nigeria, W. Africa.*
1914 Leechman, Alleyne, M.A., F.L.S., F.C.S., *Amani, nr. Tanga, Tanganyika Territory, East Africa.*
1910 Leigh, H. S., *The University, Manchester.*
1900 Leigh-Phillips, Rev. W. J., *Burtle Vicarage, Bridgwater.*
1920 ‡ Leman, G. B. C., *Wynyard,* 52, *West-hill, Putney Heath,* S.W. 15.
1920 ‡ Leman, G. C., *Wynyard,* 52, *West-hill, Putney Heath,* S.W. 15.
1924 ‡ Le Pelley, R. H., *East Malling Research Station, East Malling, Kent.*
1903†‡Levett, The Rev. T. P., *Frenchgate, Richmond, Yorks.*
1925 Levick, J., *Ashley House, Handsworth Wood, Birmingham.*
*1876 ‡ Lewis, George, F.L.S. (Council, 1878, 1884), 30, *Shorncliffe-road, Folkestone.*
1908 † Lewis, John Spedan, *North Hall, Mortimer-crescent,* N.W. 6.
1922 ‡ Light, S. S., "*Oatlands,*" *Nuwara Eliya, Ceylon.*
*1914 ‡ Lister, J. J., *St. John's College, Cambridge;* and *Merton House, Grantchester, Cambs.*
1865 † Llewelyn, Sir John Talbot Dillwyn, Bart., M.A., F.L.S., *Penllergare, Swansea.*

1925 ‡ Llewellyn Jones, Rev. J. R., J., M.A., *Newcote, West-avenue, Exeter.*
1919 ‡ Lloyd, Llewellyn, D.Sc., *Azare, Kano, N.P., Nigeria.*
1885†‡Lloyd, R. W. (Vice-Pres., 1924; Council, 1900-1, 1923–5), I, 5 and 6, *Albany, Piccadilly,* W. 1.
1920 ‡ Lodge, George, *Hawkhouse, Park-road, Camberley.*
1903 Lofthouse, T. A., *The Croft, Linthorpe, Middlesbrough.*
1925 ‡ Longfield, Miss C., 20, *Pont-street,* S.W. 1.
1908 ‡ Longsdon, D., *The Flower House, Southend, Catford,* S.E. 6.
1920 Loveridge, A., *Museum of Comparative Zoology, Cambridge, Mass., U.S.A.*
1901 Lower, Rupert S., *Tranmere, Magill-road, Canyton, S. Australia.*
1923 Lowther, R. C., M.B., Ch.B., *Fernleigh, Grange-over-Sands, Lancs.*
1898 ‡ Lucas, William John, B.A. (Council, 1904–6), 28, *Knight's-park, Kingston-on-Thames.*
1903 Lyell, G., *Gisborne, Victoria, Australia.*
1912 ‡ Lyle, G. T., *Briarfield, Stump Cross, Shibden, Halifax.*

1922 McConnell, Dr. R. E., *Ladwood, Wakefield, Rhode Island, U.S.A.*
1910 Macdougall, Professor R. Stewart, M.A., D.Sc., F.R.S.E., 9, *Dryden-place, Blacket-avenue, Edinburgh.*
1922 ‡ Mace, Herbert, *Faircotes, Harlow, Essex.*
1919 McLeod, M. C., *Court Lodge, Ware, Herts.*
1899†‡Main, Hugh, B.Sc. (Council, 1908-10), 55, *Buckingham-road, South Woodford,* E. 18.
1892 ‡ Mansbridge, W., *Monreith, Derby-road, Formby, Liverpool.*
1919 Mansfield-Aders, Dr. W., *Zanzibar.*
1926 ‡ Mansour, K., *Royal College of Science, S. Kensington,* S.W. 7.
1923 Marillier, G. H., 37, *St. John's Wood-park, Hampstead.*
1925 ‡ Marks, E., 20a, *Motcomb-street, Belgrave-square,* S.W. 1.
1920 Marriner, T. F., 2, *Brunswick-street, Carlisle.*
1895 ‡ Marshall, G. A. K., C.M.G., D.Sc., F.R.S., F.Z.S. (V.-Pres., 1919, 1924; Council, 1907–8, 1919–21, 1924–6), 48, *Pont-street,* S.W. 1.
1922 Marshall, J. F., M.A., F.Z.S., *Seacourt, Hayling Island, Hants.*
1896 Marshall, P., M.A., B.Sc., F.G.S., *Hautere, Bellevue-road, Lower Hutt, New Zealand.*
1897 Martineau, Alfred H., *Shutteroaks Toll House, Crewkerne, Somerset.*
1919 Marumo, N., *Zoological Institute, Agricultural College, Imperial University, Komaba, Tokyo, Japan.*
1922 ‡ Massee, A. M., *East Malling Research Station, East Malling, Kent.*
1895 Massey, Herbert, *Ivy-Lea, Burnage, Didsbury, Manchester.*
1865 Matthew, Gervase F., F.L.S., Paymaster-in-chief, R.N. (Council, 1887), *Lee House, Dovercourt, Harwich.*
1921 Matsumura, Prof. S., *Hokkaido Imperial University, Sapporo, Japan.*
1887 Matthews, Coryndon, *Woodside, Salcombe, S. Devon.*
1912 Maulik, Prof. S., *Dept. of Zoology, University of Calcutta, Calcutta, India.*
1916 ‡ May, Harry Haden, *Black Friars Distillery, Southside-street, Plymouth.*
1913 ‡ Meaden, Louis, *Melbourne, Dyke-road, Preston, Brighton.*
1920 ‡ Meldola, Mrs. Ella Frederica, 6, *Brunswick-square,* W.C. 1.

1919 ‡ Mellows, Charles, M.A., *The College, Bishop's Stortford.*
1885 Melvill, J. C., M.A., F.L.S., *Meole Brace Hall, Shrewsbury.*
1926 Merritt-Hawke, Mrs. O. A., M.Sc., 405, *Hagley-road, Edgbaston, Birmingham.*
1912 ‡ Metcalfe, Rev. J. W., *St. Luke's House, Torquay.*
1880 ‡ Meyrick, Edward, B.A., F.R.S., F.Z.S., *Thornhanger, Marlborough.*
1926 ‡ Michelmore, A. P. G., *Saffron Close, Chudleigh, Devon.*
1883 ‡ Miles, W. H., c/o E. Step, Esq., 158, *Dora-road, Wimbledon Park*, S.W. 19.
1920 Miller, D., 71, *Fairlie-terrace, Kelburn, Wellington, New Zealand.*
1921 Miller, N. E., *Game Preservation Department, Tanganyika Territory, E. Africa.*
1925 Millott, R. T., *Waverley-road, Mansfield, Notts.*
1926 ‡ Misthawy, A. M. El, *Plant Protection Service, Giza, Egypt.*
1923 Mitchell-Hedges, F. A., *White Rock, Brockenhurst, Hants.*
1905 ‡ Mitford, R. S., C.B., 9, *Beaconsfield-terrace, Hythe, Kent.*
1902 ‡ Montgomery, A. M., 36, *Twyford-avenue, Acton*, W. 3.
1922 ‡ Moore, A., M.D., *Sundew, Lyndhurst, Hants.*
1899 ‡ Moore, Harry, 12, *Lower-road, Rotherhithe*, S.E. 16.
1922 Moore, J. W., 151, *Middleton Hall-road, King's Norton, Birmingham.*
*1889†‡Morice, The Rev. F. D., M.A., F.Z.S., Fellow of Queen's College, Oxford (Pres., 1911–12; V.-Pres., 1902, 1904, 1913, 1919; Council, 1902–4, 1918–20), *Brunswick, Mount Hermon, Woking.*
1923 Morrison, G. D., B.Sc., *N. of Scotland College of Agriculture, Aberdeen.*
1895†‡Morley, Claude, F.Z.S., *Monk Soham House, Suffolk.*
1920 ‡ Morris, H. M., M.Sc., *Agric. Dept, Nicosia, Cyprus.*
1893 Morton, Kenneth J., 13, *Blackford-road, Edinburgh.*
1910 ‡ Mosely, Martin, E., 43, *Lansdowne Crescent*, W. 11.
1882 Mosley, S. L., *Highroyd*, 75, *Waspnest-road, Fartown, Huddersfield.*
1911 ‡ Moss, Rev. A. Miles, *c/o Messrs. Booth & Co., Para, Brazil.*
*1907†‡Moulton, John C., O.B.E., M.A., B.Sc., F.Z.S., etc., *Kuching, Sarawak* (via *Singapore*).
1911 Mounsey, J. Jackson, *Bryn-Tirion, Kingstone, Hereford.*
1922 ‡ Moysey, Capt. F., *c/o Col. R. H. Rattray*, 68, *Dry Hill Park-road, Tonbridge, Kent.*
1901 † Muir, Frederick, *H.S.P.A. Experiment Station, Honolulu, Oahu, H.I.*
1912 † Mullan, Jal P., M.A., F.L.S., F.Z.S., Professor of Biology, *St. Xavier's College, Lamington-road, Grant-road Post, Bombay, India.*
1925 Mumford, E. P., *Firbeck*, 44, *Wilmslow-road, Withington, Manchester.*
1920 Munro, H. K., B.Sc., *P.O. Box* 513, *Pretoria, South Africa.*
1918 Munro, J. W., D.Sc., *Imperial College of Science, S. Kensington*, S.W. 7.
1914 Murray, G. H., *The Residency, Kerema Gulf Division, Papua.*
1922 Musgrave, A., *Australian Museum, Sydney, N.S.W.*
1920 Myers, J. G., *Imperial Bureau of Entomology, British Museum* (*Nat. Hist.*), *Cromwell-road*, S.W. 7.

1921 Nair, K. P. U., *Training College, Trivandrum, India.*
1926 ‡ Nash, T. A. M., 16, *Queen's Road, Richmond, Surrey.*

1903 ‡ Neave, S. A., M.A., D.Sc., F.Z.S. (Secretary, 1919– ; V.-Pres., 1918; Council, 1916–18), 41, *Queen's-gate*, S.W. 7, and *Bishop's House, Beaconsfield, Bucks.*
1919 ‡ Nell, Louis, *Imperial Bureau of Entomology*, 41, *Queen's-gate*, S.W. 7.
1919 Nelson, W. G. F. (Council, 1922–4), 6, *Bolton-street*, W. 1.
1923 Nevill, T. N. C., 48, *Sloane-square*, S.W.
1901 ‡ Nevinson, E. B., *Morland, Cobham, Surrey.*
1926 Newey, H. F., *Craigmore, Coleshill-street, Sutton Coldfield.*
1923 ‡ Newland, Gordon, *Kirklees, Bath-road, Bedford Park*, W. 4.
1907 ‡ Newman, Leonard Woods, *Bexley, Kent.*
1913 Newman, L. J. W., *Bernard-street, Claremont, W. Australia.*
1909 Newstead, Alfred, *The Grosvenor Museum, Chester.*
1921 Nicholson, A. J., *University of Sydney, New South Wales, Australia.*
1914 ‡ Nicholson, Charles, 35, *The Avenue, Hale-end, Chingford*, E. 4.
1909 ‡ Nicholson, G. W., M.A., M.D. (Council, 1913–15), *Oxford and Cambridge Club, Pall Mall*, S.W. 1.
1918 ‡ Nimmy, E. W., *Zennor, Oxhey-road, Watford, Herts.*
1906 Nix, John Ashburner, *Tilgate, Crawley, Sussex.*
1923 Notman, H., F.S.A., 136, *Joralemon-street, Brooklyn, New York, U.S.A.*
1895 Nurse, Lt.-Col. C. G., *Redcote, Rusthall Park, Tunbridge Wells.*

1877 Oberthür, René, *Rennes (Ille-et-Vilaine), France.*
1910 ‡ Oldaker, Francis A., M.A., *The Red House, Haslemere.*
1921 Ollenbach, O. C., *Survey of India Dept., Dehra Dun, India.*
1925 Onslow, F. R. D., 10, *Keswick-road, East Putney*, S.W.
1913 ‡ Ormiston, Walter, *Kalupatrani, Haldummulle, Ceylon.*

1895 ‡ Page, Herbert E. (Council, 1918–20), *Bertrose, Gellatly-road, St. Catherine's Park*, S.E. 15.
1921 Pallis, M. A., *Tatoi, Aigburth-drive, Liverpool.*
1916 Palmer, A. Ray, *Standeford, Baldock-road, Letchworth, Herts.*
1919 Paravicini, Louis, *Commissioner de la Bourse de Bâle, Bâle, Switzerland.*
1918 ‡ Parris, R. S., *Raymond House, Bramley, Guildford.*
1919 Patton, Major W. S., I.M.S., 34, *York-road, Trinity, Edinburgh.*
1922 ‡ Pearce, E. J., *The Lodge, Corpus Christi College, Cambridge.*
1922 ‡ Pearce, Miss E. K., *East Morden, Wareham, Dorset.*
1911 ‡ Pearson, Douglas, *Chillwell House, Chilwell, Notts.*
1916 ‡ Peebles, Howard M., 71, *Cadogan Gardens*, S.W. 3.
1919 Peed, John, *Aylsham, Norfolk.*
1915 ‡ Peile, Lt.-Col. H. D., I.M.S., *Rawdon*, 25, *De la Warr-road, Bexhill-on-Sea.*
1921 ‡ Pendlebury, H. M., *Broadlands, Shrewsbury ;* Systematic Entomologist, *Federated Malay States.*
1914 ‡ Pendlebury, Wm. J. von. Monté, M.A., *Broadlands, Shrewsbury.*
1922 ‡ Perkins, M. G. L., 4, *Dean's-yard, Westminster-abbey*, S.W. 1.
1903 † Perkins, R. C. L., M.A., D.Sc., F.R.S., 4, *Thurlestone-road, Newton Abbot, Devon.*
1907 ‡ Perrins, J. A. D., 3rd Seaforth Highlanders, *Davenham, Malvern.*

1897 ‡ Phillips, Capt. Hubert C., F.Z.S., M.R.C.S., L.S.A., 17, *Hereford-road, Bayswater*, W. 2.

1903†‡ Phillips, Montagu A., F.R.G.S., F.Z.S., *c/o Dr. Phillips*, 57, *St. George's-square*, S.W.

1920 Philpott, A., Assistant Entomologist, Biological Dept., *Cawthron Institute of Scientific Research, Nelson, New Zealand.*

*1922 ‡ Piazza, E., 4734, *48th-street, San Diego, California, U.S.A.*

1917 ‡ Pickard-Cambridge, Arthur W., M.A., *Balliol College, Oxford.*

1891 ‡ Pierce, F. N., *The Old Rectory, Warmington, Oundle, Northants.*

1913 Platt, E. E., 403, *Essenwood-road, Durban, Natal.*

1919 Pomeroy, A. W. Jobbins, *Medical Research Institute, Accra, Gold Coast.*

1870†‡ Porritt, Geo. T., F.L.S. (Council, 1887), *Elm Lea, Dalton, Huddersfield.*

1884†‡ Poulton, Professor Edward B., D.Sc., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., Hope Professor of Zoology in the University of Oxford, President (Pres. 1903–4, 1925–6; V.Pres., 1894–5, 1902, 1905, 1922–3; Council, 1886–8, 1892, 1896, 1905–7, 1922–4), *Wykeham House, Banbury-road, Oxford.*

1905 Powell, Harold, 7, *rue Mireille, Hyères (Var), France.*

1921 Powniah, D., *Agricultural Dept., Kuala Lumpur, Fed. Malay States.*

1919 Praed, C. W. M., *Dalton Hill, Albury, Surrey.*

1878 Price, David, 12, *Worthing-road, Horsham.*

1922 Price, J., 165, *Corporation-street, Stafford.*

1908 ‡ Prideaux, R. M. (Council, 1917), *Woodlands, Brasted Chart, Sevenoaks.*

1920 ‡ Prior, W. H. T., *Culban, Main-road, New Eltham, Kent.*

1904 ‡ Priske, Richard A. R., 9, *Melbourne-avenue, West Ealing.*

1920 Prout, Miss Alice Ellen, *Lane End, Hambledon, Godalming.*

1893 ‡ Prout, L. B. (Council, 1905–7), 84, *Albert-road, Dalston*, E. 8.

1924 Pruthi, Hem Singh, *Zoological Laboratory, University of Cambridge.*

1910 Punnett, Professor R. C., M.A., *Caius College, Cambridge.*

1926 Puri, Dr. I. M., *Central Research Institute, Kasauli, Punjab, India.*

1922 ‡ Rae, Mrs. Margaret, *Courthill, Birkenhead.*

1923 ‡ Raff, Miss Janet W., M.Sc., *c/o The Biology School, University of Melbourne, Victoria, Australia.*

1912 ‡ Rait-Smith W. (Council, 1924–6), *Birkby House, Bickley Park, Kent.*

1924 ‡ Ralfs, Miss E. M., 204a, *Portsdown-road, Maida Vale*, W. 9.

1916 Ramachandra, R. Y., M.A., *Agricultural College, Coimbatore, India.*

1920 ‡ Rambousek, Dr. F. G., M.P., vii/1169, *Prague, Czechoslovakia.*

1920 Raymundo, Prof. Benedicto, Director of the Agricultural Society's Museum, 76, *rua Senador Alencar, Rio di Janeiro, Brazil.*

1907 ‡ Rayward, A. L., 1, *Meadhurst, Mead-road, Eastbourne.*

1898 Reuter, Professor Enzio, *Helsingfors, Finland.*

1910 ‡ de Rhé-Philipe, G. W. V., *Birkheads, Reigate, Surrey.*

1921 Rhodes, F., *Corporation Art Gallery and Museum, Cartwright Memorial Hall, Lister Park, Bradford.*

1920 ‡ Rhynehart, J. G., A.R.C.Sc.I., N.D.A., *Ministry of Agriculture, Wellington-place, Belfast.*

1924 ‡ Richards, O. W., 73, *Cowley-road, Oxford.*

1920 ‡ Richards, P. B., Govt. Entomologist, *Dept. of Agriculture, United Provinces, Allahabad, India.*

1920 ‡ Richardson, A. W., 28, *Avenue-road*, Southall, Middlesex.
1922 ‡ Richardson, Rev. W. H., 32, *Shirburn-road, Leek, N. Staffs.*
1921 Riddell, Miss J., 815, *El Centro-avenue, Los Angeles, California, U.S.A.*
1924 Riley, C. F. C., *Dept. of Zoology, Univ. of Manitoba, Winnipeg, Canada.*
1912 ‡ Riley, N. D., F.Z.S. (Secretary, 1926– ; Council, 1921–3), 5, *Brookgardens, Beverley-road, Barnes*, S.W. 13, and *British Museum* (*Natural History*), *S. Kensington*, S.W. 7.
1908 ‡ Rippon, Claude, M.A., 28, *Springfield House, Abingdon.*
1926 ‡ Robbins, J. C., *The Rosery, Limpsfield, Surrey.*
1917 Roberts, A. W. Rymer, M.A., *Molteno Inst., Downing-street, Cambridge.*
1889–1898, 1925 :
Robinson, A., B.A., *Bretanby, Seal, nr. Sevenoaks, Kent.*
1905 Robinson, Herbert C., *c/o Lloyds Bank* (*King's Section*), 6, *Pall Mall*, S.W. 1.
1904 ‡ Robinson, Lady, *Worksop Manor, Notts.*
1921 Roebuck, A., *Midland Agricultural and Dairy College, Sutton Bonington, Loughborough.*
1908 ‡ Rogers, The Rev. Canon K. St. Aubyn, M.A., *C.M.S., Dabida, Voi, Kenya Colony, E. Africa.*
1922 Rosa, A. F., M.D., 28, *Pitt-street, Edinburgh.*
1907 ‡ Rosenberg, W. F. H., 57, *Haverstock-hill*, N.W. 3.
1888†‡Rothschild, The Right Hon. Lord, D.Sc., F.R.S., F.L.S., F.Z.S. (President, 1921–2; Vice-President, 1920, 1923; Council, 1900, 1919), *Zoological Museum, Tring.*
1890 ‡ Routledge, G. B., *Tarn Lodge, Heads Nook, Carlisle.*
1922 Russell, Frank, *Auldham House, Worksop, Notts.*
1892 ‡ Russell, S. G. C., *The Elms, Eastrop, Basingstoke.*
1922 Ruston, A. H., *Aylesbury House, Chatteris, Cambs.*
1922 Ryle, G. B., *Pangbourne, Berks.*

1919 ‡ St. Aubyn, Capt. John G., *Sayes Court Hotel, Inverness-terrace, Hyde Park*, W.
1920 St. John, W. St. A., M.R.C.S., L.R.C.P., *Derwent House, Derby.*
*1906 Sampson, Colonel F. Winn, 115, *Tannsfield-road, Sydenham.*
1926 Samman, Miss M., *Willerby Manor, nr. Hull.*
1910 ‡ Saunders, H. A., *St. Ann's, Reigate.*
1923 ‡ Saunders, L. G., M.Sc., Ph.D., *Dept. of Zoology, Univ. of Saskatchewan, Saskatoon, Canada.*
1920 Scharff, Dr. J. W., *Govt. Medical Dept., Singapore.*
1901 Schaus, W., F.Z.S., *U.S. National Museum, Washington, D.C., U.S.A.*
1920 Schlupp, W. F., B.Sc., *Newcomerstown, Ohio, U.S.A.*
1907 ‡ Schmassmann, W., *Beulah Lodge, London-road, Enfield*, N.
1912 Schunck, Charles A.
1909 ‡ Scott, Hugh, M.A., Sc.D., Vice-President (Council, 1925–), Curator in Entomology, *University Museum of Zoology, Cambridge.*
1920 ‡ Seabrook, J., *South Court, Lower Ham-road, Kingston-on-Thames.*
1911 Selous, C. F., M.D., M.R.C.S., L.R.C.P., 25, *Church-road, Tunbridge Wells.*
1923 Sen, S. K., B.Sc., *Agricultural Research Institute, Pusa, India.*

1911††Sennett, N. S.,
1926 Sevastopulo, D. G., *c/o Ralli Bros., Karachi, India.*
1924 ‡ Sharp, E. P., 1, *Bedfordwell, Eastbourne.*
1925 Shaw, F., *Maadi, nr. Cairo, Egypt.*
1886 Shaw, George T. (Librarian of the Liverpool Free Public Library), *William Brown-street, Liverpool.*
1905 ‡ Sheldon, W. George, F.Z.S. (Treasurer, 1918– ; Vice-President, 1920), *West Watch, Limpsfield, Surrey.*
1900††Shepheard-Walwyn, H. W., M.A., *Dalwhinnie, Kenley, Surrey.*
1923 Sherman, J. D., Jun., 132, *Primrose-avenue, Mt. Vernon, New York, U.S.A.*
1926 ‡ Shibuya, J., *Hokkaido Imp. Univ., Sapporo, Japan.*
1887††Sich, Alfred (Council, 1910–12), *c/o George Sich, Esq., Grayingham, Farncombe-road, Worthing.*
1911 ‡ Simes, J. A., *Kingsley Cottage, Queen's-road, Loughton, Essex.*
1904 ‡ Simmonds, Hubert W., *Dept. of Agriculture, Suva, Fiji.*
1921 ‡ Simms, H. M., B.Sc., *The Farlands, Stourbridge.*
1926 Simpson, R. G., *Verona, Manor Park-crescent, Edgware, Middlesex.*
1924 Simpson-Hayward, G. H., *Icomb Place, Stow-on-the-Wold, Gloucestershire.*
1926 Skinner, G. S., *Usine Ste. Madeleine, Trinidad, B.W.I.*
1926 Skaife, Dr. S. H., *Dept. of Education, Cape Town, S. Africa.*
1922 Sloane, T. G., *Moorilla, Young, New South Wales, Australia.*
1906 ‡ Smallman, R. S., *Heathersett*, 30, *Leigham Court-road, Streatham*, S.W. 16.
1916 ‡ Smart, Major H. Douglas, M.D., B.S., 172, *High-road, Salway Hill, Wood ford Green, Essex.*
1920 ‡ Smee, C., Govt. Entomologist, *Zomba, Nyasaland.*
1915 ‡ Smith, A. C., *Horton, Mornington-road, Woodford Green.*
1901 Smith, Arthur, *County Museum, Lincoln.*
1911 ‡ Smith, B. H., B.A., 20, *Third-avenue, Hove, Sussex.*
1924 ‡ Smith, F. Stanley, *Sunnyside, Middle Bourne, Farnham, Surrey.*
1925 Smith, K. M., M.Sc., *Dept. of Agricultural Entomology, The University, Manchester.*
1919 Smith, S. Gordon, F.L.S., *Estyn, Boughton, Cheshire.*
1918 † Smith, W. P., F.Z.S.
1925 ‡ Soliman, H. S., 130, *Queen's-gate*, S.W. 7.
1885 ‡ South, Richard (Council, 1890–1), 4, *Mapesbury-court, Shoot-up Hill, Brondesbury*, N.W. 2.
1916 ‡ Sowerby, F. W., *Stafford House, Cleethorpes, Lincs.*
1908 ‡ Speyer, Edward R., *Ridgehurst, Shenley, Herts.*
1919 Stansfield, Capt. L. R., R.G.A.
1910 ‡ Stenton, R., *Imperial Bureau of Entomology, Farnham House, Farnham Royal, Bucks.*
1923 Stewart, A. M., 8, *Ferguslie, Paisley*, N.B.
1922 Stewart, B., *Lovell House, Leeds, Yorks.*
1920 ‡ Stidston, Engr.-Commander S. T., R.N., *Ashe, Ashburton, S. Devon.*
1918 ‡ Stiff, Rev. Alfred T., *All Souls' Vicarage, Brighton.*
1910 ‡ Stoneham, H. F., *The East Surrey Estate, P.O. Charangani, Trans Nyora, Kenya Colony.*
1915 ‡ Stott, C. E., *Eaton, London-road, Reigate.*

1896 ‡ Strickland, T. A. G., 39, *Rosary Gardens, S. Kensington*, S.W.
1919 Susainathan, P., *College of Agriculture, Coimbatore, S. India.*
1925 Swiestra, C. J., *Director, Transvaal Museum, Pretoria.*
1876 ‡ Swinton, A. H., *Oak Villa, Braishfield, Romsey, Hants.*
1911 ‡ Swynnerton, C. F. M., *Kilosa, Tanganyika Territory.*
1920 ‡ Syms, Edgar E., 22, *Woodlands-avenue, Wanstead*, E. 11.

1910 Tait, Robt., junr., *Covertside, Moss-lane, Ashton-on-Mersey.*
1908 ‡ Talbot, G., *Mon Plaisir, Wormley, Surrey.*
1920 ‡ Tams, W. H. T., 19, *Sulivan-road, Hurlingham*, S.W. 6.
1918 Tapp, Capt. W. H., F.R.A.S., F.R.G.S.
1916 Tatchell, L. S., *Swanage, Dorset.*
1903 Taylor, T. H., M.A., *Yorkshire College, Leeds.*
1914 Temperley, Reginald, *The Manor House, Merricott, Somerset.*
1919 ‡ Temple, Major Watkin, *East Mersea, Essex.*
1910 ‡ Theobald, Prof. F. V., M.A., *Wye Court, Wye, Kent.*
1925 Thompson, H. W., *Research Dept. in Agriculture, University College, Cardiff.*
1901 ‡ Thompson, M. L., 40, *Gosford-street, Middlesbrough.*
1892 Thornley, The Rev. A., M.A., F.L.S., *St. Anaels, Sea View Terrace, St. Ives, Cornwall.*
1926 ‡ Thorpe, W. H., B.A., *Zoological Laboratory, Cambridge.*
1907 ‡ Tillyard, R. J., M.A., D.Sc., F.R.S., F.L.S., Chief of the Biological Dept., *Cawthron Inst. of Scientific Research, Nelson, New Zealand*, and *Maitai Lodge, Bridge-street, Nelson, N.Z.*
1920 Tinsley, Joseph, *West of Scotland Agricultural College, Burns-avenue, Kilmarnock.*
1897 ‡ Tomlin, J. R. le B., M.A. (Council, 1911–13), 23, *Boscobel-road, St. Leonards-on-Sea.*
1907 ‡ Tonge, Alfred Ernest (Council, 1915–17), *Aincroft, Reigate, Surrey.*
1920 Tonge, Alfred E., *Ashville, Trafford-road, Alderley Edge, Cheshire.*
1914 de la Torre Bueno, J. R., 11, *North-broadway, White Plains, New York, U.S.A.*
1906 ‡ Tulloch, Col. J. B. G., C.B., C.M.G., *Head Quarters, 4th Division, Colchester,*
1895 ‡ Tunaley, Henry, *Castleton, Searle-road, Farnham.*
1910 Turati, Conte Emilio, 4, *Piazza S. Alessandro, Milan, Italy.*
1898 ‡ Turner, A. J., M.D., *Wickham-terrace, Brisbane, Australia.*
1893 ‡ Turner, Henry Jerome (Librarian, 1921– ; Council, 1910–12), 98, *Drakefell-road, New Cross*, S.E. 14.
1906 ‡ Turner, Rowland E. (Council, 1909–10), *British Museum (Natural History), S. Kensington*, S.W. 7.
1923 ‡ Twidle, A., N.S.A., *The Rowans, Godstone Green, Surrey.*
1915 ‡ Tytler, Maj.-Gen. H. C., C.B., C.M.G., D.S.O., C.I.E., *c/o Grindlay & Co.*, 54, *Parliament-street*, S.W. 1.

1893 ‡ Urich, F. W., C.M.Z.S., *Port of Spain, Trinidad, British West Indies.*
1920 ‡ Uvarov, B., *Natural History Museum, S. Kensington*, S.W. 7.

1923 ‡ Valentine, A., *Grand Hotel, Herne Bay, Kent.*

1922 ‡ Van Someren, V. G. L., C.M.Z.S., *Nairobi, Kenya Colony.*
1924 ‡ Van Straubenzee, Brig-Gen., C. H. Casimir, C.B., C.B.E., 3, *Sussex Mansions, Sussex-place,* S.W. 7.
1904†‡Vaughan, W.
1914 ‡ Veitch, Robert, B.Sc., *Dept. of Agriculture, Brisbane, Australia.*
1909 Vidler, Leopold A., *The Carmelite Stone House, Rye.*
1911 Vitalis de Salvaza, R., *chez Mme. G. Combe,* 10, *Rue d'Italie, Marseilles.*

1897 ‡ Wainwright, C. J. (Council, 1901, 1912–14), *Daylesford, Handsworth Wood, Birmingham.*
1918 Walford, L. J., *The Cavalry Club, Piccadilly,* W.
1878 ‡ Walker, J. J., M.A., R.N., F.L.S. (President, 1919–20; V.-Pres., 1916, 1921; Sec., 1899, 1905–1918; Council, 1894, 1921), *Aorangi, Lonsdale-road, Summertown, Oxford.*
1921 Walker, S., 53, *Micklegate-hill, York.*
1920 Wallace, William, M.B., 15, *Hainton-avenue, Grimsby.*
1921 Wallis, H. H., M.A., *Rye Grammar School, Rye, Sussex.*
1920 Walters, O. H., *c/o Standard Bank of S. Africa, Port Elizabeth, S. Africa.*
1919 ‡ Ward, J. Davis, *Limehurst, Grange-over-Sands, Lancs.*
1910 ‡ Ward, John J., *Natura, Woodland-avenue, Coventry.*
1908 ‡ Warren, B. C. S., 14, *Avenue de l'Eglise Anglaise, Lausanne, Switzerland.*
1901 † Waterhouse, G. A., B.Sc., B.E., *Allowrie, Stanhope-road, Killara, New South Wales, Australia.*
1923 ‡ Waters, E. G. R., M.A., 184, *Woodstock-road, Oxford.*
1914 ‡ Waterston, James, B.D., D.Sc. (Council, 1920–2), *British Museum (Natural History), S. Kensington,* S.W. 7.
1921 Watkinson, The Rev. G., M.A., *Woodfield, Hipperholme, nr. Halifax.*
1919 ‡ Watson, E. B., *The Entomological Branch, Dept. of Agriculture, Ottawa, Ont., Canada.*
1918 Watson, J. H., 70, *Ashford-road, Withington, Manchester.*
1914 Watt, Morris N., *St. John's Hill, Wanganui, New Zealand.*
1923 West, Lieut.-Col. R. M., M.D., D.S.O., O.B.E., *Wootton Bridge, Isle of Wight.*
1906 ‡ Wheeler, The Rev. George, M.A., F.Z.S. (Secretary, 1911–21; V.-Pres., 1914; Council, 1921), *Ellesmere, Gratwicke-road, Worthing.*
1910 ‡ White, E. Barton, M.R.C.S., *The Mental Hospital, Fishponds, Bristol.*
1918 White, Ronald Senior, *Central Research Institute, Kasauli (Simla Hills), India.*
1923 ‡ Whitfield, F. G. S., *Wellcome Tropical Research Laboratories, Khartoum, Sudan.*
1913†‡Whitley, P. N., *Brantwood, Halifax ;* and *New College, Oxford.*
1921 ‡ Whitney, W. B., B.Sc., A.M.Inst.C.E., *Glen Doone, Gerrard's Cross, Bucks.*
1913 † Whittaker, Oscar, F.R.M.S., *Box* 552, *Chilliwack, British Columbia.*
1911–1920, 1925 :
Whittingham, Rt. Rev. A. G., Lord Bishop of St. Edmundsbury and Ipswich, *The Bishop's House, Ipswich.*
1917 ‡ Wickham, Rev. Prebendary A. P., *East Brent Vicarage, Highbridge, Somerset.*

1926 ‡ Wigglesworth, V. B., *Dirleton House, Battlefield-road, St. Albans.*
1923 Wightman, A. J. C., *Aurago, W. Chiltington Common, Pulborough, Sussex.*
1896 ‡ Wileman, A. E., 37, *Queen's-gate Gardens*, S.W. 7.
1922 ‡ Wilkinson, Capt. D. S., *Board of Agriculture, Nicosia, Cyprus.*
1923 Wilkinson, Harold, *P.O. Box* 93, *Kampala, Uganda.*
1911 ‡ Williams, C. B., M.A., *Ministry of Agriculture, Cairo, Egypt*, and 20, *Slatey-road, Birkenhead.*
1915 Williams, H. B., LL.D., *Briar Cottage, Vale-road, Claygate, Surrey.*
1921 ‡ Willmer, E. Nevill, *Trafford Hall, near Chester.*
1922 Wilson, F. E., 22, *Ferncroft-avenue, E. Malvern, Victoria, Australia.*
1921 ‡ Wilson, H. I., O.B.E., M.A., F.Z.S., 139, *Bishop's Mansions, Fulham*, S.W. 6.
1919 † Wilson, Lt.-Col. R. S., *Army and Navy Club, Pall Mall*, S.W.
1925 Winckworth, R., 37, *Upper Rock Gardens, Brighton.*
1915 Winn, A. F., 32, *Springfield-avenue, Westmount, Montreal, Canada.*
1922 ‡ Winser, H. E., *Corydon, Horsham-road, Cranleigh, Surrey.*
1923 ‡ Winstanley, E. J., L.D.S., R.C.S., 32, *Belsize-grove, Haverstock Hill*, N.W. 3.
*1920 ‡ Withycombe, C. L., Ph.D., M.Sc., D.I.C., *Zoological Laboratory, The Museum, Cambridge.*
1926 Womersley, H., *Sunny Meads, West Town, nr. Bristol.*
1919 ‡ Wood, H. Worsley, 31, *Agate-road, Hammersmith*, W. 6.
1905 Woodbridge, F. C., *Briar Close, Latchmore-avenue, Gerrard's Cross S.O., Bucks.*
1925 Woodcock, A. J. A., M.Sc., *Clifton Manor, York.*
1914 ‡ Woodforde, F. C., B.A., *c/o Hope Department, University Museum, Oxford.*
1925 ‡ Woodward, Commander G. C., *Training Ship "Cornwall," Purfleet, Essex.*
1921 Woolett, G. F. C., *Sipilang, Province Clarke, B.N. Borneo.*
1926 de Worms, C. G. M., *Milton Park, Egham, Surrey.*
1926 ‡ Worthington, E. B., *Caius College, Cambridge.*
1922 Wright, A. E., *Burnleigh, Kent Bank-road, Grange-over-Sands.*
1926 Wyatt, C. W. fforde, 14, *Cavendish-square*, W. 1.

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BENEFACTIONS.

List of Donations of the amount or value of Twenty pounds and upwards.

1852.

Miss Bromfield, 67 volumes from the library of W. A. Bromfield.

1861.

H. T. Stainton, £25.*

1864.

J. W. Dunning, £123 5*s.*

1867.

The same, towards cost of publications, £105.

1868.

H. J. Fust, towards the cost of his paper on Geographical Distribution, £25.
The Royal Society, for the same, £25.

1869.

J. W. Dunning, £50.
W. W. Saunders, cost of drawing and engraving 24 plates for Pascoe's "Longicornia Malayana."

1870.

J. W. Dunning, £20.
The same, the entire stock of eight vols. of the Transactions.

1872.

The same, towards cost of publications, £50.

1875.

The same, cost of removal of Library and new book-cases, £99 17*s.* 4*d.*

1876.

The same, towards cost of publications, £150.

1879.

H. T. Stainton, £20 10*s.* 6*d.*

1880.

The same, £20.

1881.

J. W. Dunning, towards cost of publications, £40.
H. T. Stainton, for the same, £25.

1882.

The same, £30.

1883.

The same, £35.

1884.

J. W. Dunning, £50.
H. T. Stainton, £40.
W. B. Spence, his late father's library.

1885.

J. W. Dunning, £35.
The same, the whole cost of the Society's Charter.

* It has not always been possible to find the exact purpose for which the earlier money gifts were intended, but they appear to have been usually in support of the publications.

1893.

The same, towards cost of publishing the Library Catalogue, £25.

1894.

The same, £45.
The Misses Swan, £250 for the "Westwood Bequest," the interest to be used for plates in the Transactions.
F. D. Godman (in this and subsequent years), "Biologia Centrali-Americana."

1898.

Mrs. Stainton, about 800 volumes and pamphlets from H. T. Stainton's Library.

1899.

S. Stevens, legacy, £100.

1902.

G. W. Palmer, M.P., towards cost of printing G. A. K. Marshall's paper on the Bionomics of African Insects, £30.
Prof. E. B. Poulton, towards cost of plates, £65.

1903.

H. J. Elwes, cost of plates to illustrate his paper on the Butterflies of Chile, £36 18*s*. 2*d*.
F. D. Godman, cost of plates to illustrate his paper on Central and S. American Erycinidae.

1904.

H. L. L. Feltham, towards cost of plates for R. Trimen's paper on S. African Lepidoptera, £20.

1906.

The same, towards cost of plates for R. Trimen's paper on African Lepidoptera, £20.

1908.

E. A. Elliott (in this and subsequent years), Wytsman's "Genera Insectorum."

1909.

Ch. Oberthür (in this and subsequent years), his "Lépidopterologie comparée."

1910.

Dr. T. A. Chapman, towards cost of plates for his papers on Life-histories of Lepidoptera, £25.

1911.

Sir G. Kenrick, Bart., cost of plates for his paper on Butterflies of Dutch New Guinea, £54.

1912.

Dr. T. A. Chapman, cost of plates for his papers on Life-histories of Lepidoptera, £35 6*s*. 5*d*.

1913.

The Royal Society, towards the publication of D. Sharp's paper on the Genitalia of Coleoptera, £60.

1914.

F. D. Godman, cost of plates for G. C. Champion's papers on Mexican and Central American Coleoptera, £22 7*s*. 6*d*.
G. T. Bethune-Baker, cost of 12 plates illustrating his Presidential Address.

1915.

J. J. Joicey, cost of plates for his papers on Lepidoptera from Dutch New Guinea, £82 11*s*.
Dr. G. B. Longstaff, cost of plates for Dr. Dixey's paper on New Pierines, £32.
Prof. R. Meldola, legacy (subject to the life-interest of Mrs. Meldola), £500.

1916.

Dr. T. A. Chapman, for plates, £68 7*s.* 3*d.*

1917.

Mrs. Meldola, for books for the Library, £31 10*s.*
E. E. Green, large binocular microscope.

1919.

Dr. T. A. Chapman, F.R.S., cost of plates to illustrate his papers, £56 19*s.* 3*d.*

1920.

Donations in aid of the purchase of 41 Queen's Gate—
Dr. G. B. Longstaff, £1000.
The Honble. N. C. Rothschild, £500.
Dr. H. Eltringham, Sir G. H. Kenrick, The Rev. F. D. Morice, W. G. Sheldon, each £100.
R. Adkin, G. T. Bethune-Baker, Dr. T. A. Chapman, W. M. Christy, H. Massey, Prof. E. B. Poulton, each £50.
B. H. Crabtree, E. E. Green, Dr. G. A. K. Marshall, G. A. J. Rothney, each £25.
H. E. Andrewes, £21.
H. J. Elwes, E. B. Nevinson, G. T. Porritt, O. Whittaker, each £20.
Dame Alice Godman, book-shelves and fittings for the Library.
J. J. Joicey, in aid of the furnishing of 41 Queen's Gate, £100.
Dr. T. A. Chapman, F.R.S., cost of plates to illustrate his paper, £30.

1921.

Donations in aid of the purchase of 41 Queen's Gate—
The Rt. Hon. Lord Rothschild, £105.
W. M. Christy, £50, making with a similar donation in 1920, £100 in all.
W. G. F. Nelson, £63, reduction of solicitor's charges.
W. J. Kaye, £50.
W. Schmassman, £50.
R. Adkin, £40, cancellation of debentures drawn.
E. C. Bedwell, £28 7*s.* 6*d.*, reduction of surveyor's charges.
H. Willoughby Ellis, £26 5*s.*
Lt.-Col. R. S. Wilson, £25.
H. St. John Donisthorpe, £21.
Miss E. F. Chawner, £20.
Sir John T. D. Llewelyn, Bart., £20.
K. J. Morton, £20.
J. J. Joicey, Lantern and Stand for the Meeting Room.
Dr. T. A. Chapman, F.R.S., £29 5*s.*, to illustrate his paper in the Transactions, 1920.
The Rt. Hon. Lord Rothschild, £22 15*s.* 4*d.*, cost of plates in the Proceedings for 1920.
Jesus College, Oxford, through Prof. E. B. Poulton, F.R.S., £100.

1922.

Donations in aid of the purchase of 41 Queen's Gate—
The Misses Chapman, in memory of their brother, the late Dr. T. A. Chapman, F.R.S., £500.
G. A. J. Rothney (bequest), £150.
R. Adkin, £70, cancellation of debentures drawn.
E. E. Green, £25 (making £50 in all).
W. H. B. Fletcher, £25.
Sir A. Buchan-Hepburn, Bart., £20.
E. W. Adair, £20.
The Misses Chapman, two bookcases.

1923.

Donations in aid of the purchase of 41 Queen's Gate—
N. C. Rothschild (bequest), £1000.
R. Adkin, £90, cancellation of debentures drawn (making £200 in all).
A. C. F. Morgan, £20.
H. J. Turner, £20.

1924.

Donations in aid of the purchase of 41 Queen's Gate—
E. B. Bostock, £21.
Miss M. E. Fountaine, £20.

H. H. C. Druce (bequest £1000), interest to be spent on new books.

Prof. E. B. Poulton, F.R.S., authorised contribution from the Fund for promoting the study of organic and social evolution, presented to the University of Oxford by Professor J. Mark Baldwin, £130 15*s.* 4*d.*

Jesus College, Oxford, through Prof. E. B. Poulton, F.R.S., £125.

H. Willoughby Ellis, contribution towards new electric light installation at 41 Queen's Gate, £50.

1925.

A. H. Jones (bequest) £100.

G. T. Bethune-Baker, £30, towards the cost of the plates in his paper.

E. A. Elliott, in continuation of his practice since 1908, Wytsman's "Genera Insectorum," amounting to a total value of £225.

The Royal Society, £100, towards the cost of Mr. H. S. Pruthi's paper.

1926.

The Royal Society, £150, towards the cost of Mr. Warren's paper.

"After the fishy odour a more ammoniacal one, resembling that of a foul stable or of putrefying urine, supervenes, due to the further breaking down of amino bodies. This attracts other insects."

Specimens of *Calopteron fasciatum*, F., larvae, pupae and adults were shown, together with a mass of about two hundred larval and pupal exuviae attached to a piece of bark.

Adults and pupae of *Pantophthalmus tabaninus*, Thunb., were also exhibited. This fly oviposits in *Erythrina* trees, the larva boring in the wood. The life-history has been worked out by Mr. F. W. Urich in Trinidad.

Algerian Lycaenidae and Hesperiidae.—Mr. O. R. Goodman exhibited Lycaenidae and Hesperiidae taken during May and June 1926 in or near the Cedar forests at Teniet el Haad, Algeria, namely both sexes of *Lycaena martini*, *Hesperia leuzeae*, and *H. ahmed*. All three species were stated to be extremely rare in collections, especially *H. leuzeae*, of which, so far as could be ascertained, only the unique ♂ type in the Oberthür collection was previously known. The very beautiful *Lycaena fatma*, Ob., also by no means common, taken at Mt. Belezma, near Batna, Algeria, was also exhibited.

The species of *Adelpha* occurring at Pará.—The Rev. A. Miles Moss exhibited 13 species of *Adelpha* from Pará, together with their pupa cases, and made the following remarks :—

"In the volume of Seitz's *Macrolepidoptera of the World* dealing with the American fauna (Volume 11), Fruhstorfer enumerates some 60 species of the genus *Adelpha*. Of these 31 are recorded from Central America, and but a meagre 13 from the Amazon. My curiosity being aroused, I set to work upon the life-histories of this particularly interesting and difficult genus; my notes now only await revision at the hands of Dr. Jordan before being published elsewhere.

"I now give but the briefest résumé of my attempts and successes in explanation of the box of Adelphas brought for exhibition this evening.

"From the time that my interest was stimulated in the quest two years ago, it was not long (barely 6 months, I think) before I had secured 12 distinct species of *Adelpha* in Pará, and bred 11 from the larvae, which (with one omission unnoted at the time) were figured carefully on each occasion in the larval and pupal condition.

"Amongst my material Dr. Jordan has already detected another; and, as the whole 13 species come from the immediate environment of the city of Pará, situated at 1°·27 S. latitude at the mouth of the Amazon, it requires no great effort of the imagination to suppose that Fruhstorfer's record is under the mark, and that there must almost certainly be more than just those 13 species, which I have recorded, throughout the length and breadth of that vast system of waterways which make up the Amazon.

"I want chiefly to direct your attention to a number of striking differences between the species, as also to a few unexpected parallels.

"Of the 13 species two, as butterflies, viz. *A. cytherea* and *A. mesentina* cannot possibly be confounded with any others. Not so, however, with some of the rest, especially when caught and possibly a bit worn.

"As larvae, associated with the same food-plant on each occasion, three pairs of species may be readily confused, as also their pupae. The remainder bear

sufficiently strongly marked differentiating features from one another, not only in the larval and pupal conditions but in their food-plants.

"In the first pair, feeding on *Miconia* (MELAST.) this similarity is not to be wondered at, as it is obvious from the butterflies that the two species are very closely akin (i.e. *A. celerio* and *A. serpa*).

"In the second pair (*A. mesentina* and *A. delphicola*), feeding on several species of *Cecropia* and *Pourounea* (MORACEAE) the apparent identity of their larvae, and still more that of their strangely-formed pupae, is little short of extraordinary, seeing that their butterflies are totally dissimilar, and are far apart from one another as species, if indeed our present classification in Seitz is correct.

"In the third pair, two larvae, very similar to *Limenitis sibylla*, feeding on *Sabicea*, a Rubiaceous creeper, produce *A. cytherea* and *A. boeotia* (if my second name is the correct one). Moreover their pupae, unlike all the others that I know, have each a pair of short 'ears,' *Vanessa*-like, projected forwards. The exact shape of the dorsal hump or cowl on segment six would appear to be the only obvious and constant feature of difference between the two. And yet, once again, these two butterflies are supposed to be far apart from one another, and they are certainly very distinct in appearance.

"Conversely, to give but one final illustration, the adults of *A. delphicola* and *A. erotia* (supposing my designations to be correct) are indeed difficult to differentiate. Nevertheless, nothing in the whole realm of a single genus can be more distinct than are the larvae and pupae of these two species, while their food-plants too are utterly unrelated."

"TERRIFYING ATTITUDE" IN A HESPERID PUPA.—The Rev. A. MILES MOSS also exhibited the pupa of *Bungalotis erythus*, a large Hesperid butterfly, described in Seitz as being peculiarly rare in the interior district of Peru, but now taken periodically and fairly commonly in Pará. The large pink larva lives between the leaves of an Araliaceous tree known as Morototó, and the pupa is invariably to be found between dry leaves lightly spun together on the ground within a yard of the trunk. The interest of the exhibit lay in the somewhat unprecedented record of a Hesperid pupa adopting the terrifying attitude and looking like the larva of a Chaerocampid Hawk Moth.

Papers.

The following papers were read :—

1. "The uncus in the Microlepidoptera," by Mr. A. PHILPOTT.
2. "The morphology of the Aedeagus in Delphacidae," by Mr. F. MUIR.
3. "The immature stages of *Psephenoides gahani*, Champ.," by Mr. A. G. BÖVING. (Communicated by Mr. G. C. Champion.)
4. "On the British biting midges (Dipt. Ceratopogonidae)," by Mr. F. W. EDWARDS.
5. "The phenomenon of Myrmecoidy, with new examples from Cuba," by Dr. J. G. MYERS and Mr. G. SALT.

Wednesday, October 20th, 1926.

Professor E. B. Poulton, F.R.S., President, in the Chair.

Election of Fellows.

The following were elected Fellows of the Society:—Mrs. Olive Grey, 90, Charing Cross Road, London, W.C.2; Melville H. Hatch, Department of Zoology, University of Michigan, Ann Arbor, Michigan, U.S.A.; C. G. Maurice de Worms, Milton Park, Egham, Surrey.

Exhibits.

Myrmecophilous Beetles.—Mr. Donisthorpe exhibited a series of two myrmecophilous beetles—*Tachyusida gracilis*, Er., and *Euconnus* (*Napochus*) *claviger*, Müll., both new to Britain, and guests of the ant *Acanthomyops* (*Donisthorpea*) *brunneus*, Latr., which he had taken with that ant in an old oak tree in Windsor Forest on October 12th and 16th. He gave some account of the habits of these beetles and their distribution, etc.

Lycaenids from Switzerland and France.—Brig.-General B. H. Cooke again exhibited and made further remarks on the Lycaenids shown at the previous meeting. In connection with this exhibit:—

The Rev. G. Wheeler exhibited specimens of *Polyommatus polonus*, the supposed hybrid between *P. corydon* and *P. thetis*. Five of the specimens were taken at Assisi in the summer of 1910, three of them among *P. thetis* before *P. corydon* had emerged, and the other two among *P. corydon* after *P. thetis* was over; of the other two specimens one was taken at Oberbozen in the Tyrol in June 1923 and the other at Pugny, above Aix-les-Bains in June 1925. *P. thetis* occurred in both these localities, but the date was too early for *P. corydon*. In view of the circumstances under which the Assisi specimens were taken, the theory of hybridism appeared the most probable.

He also exhibited specimens of both broods of the species long confused with *P. corydon*, both from Italy and the French Riviera.

Mr. E. B. Ashby exhibited specimens of *Lycaena* "*arragonensis*" from Digne, Basses Alpes, and Arquata, S. Piedmont; also specimens of *L. corydon* from the same localities and from Lardy, S.E. of Paris, from Veyrier (near Geneva), La Ste Baume (Var.), and Amberley, Sussex. He pointed out that although the "*arragonensis*" taken in July and August differed markedly from the ordinary *corydon* exhibited, those taken in the spring bore a much closer resemblance to them. He called attention to the suggestion, already made elsewhere, that "*arragonensis*" and *corydon* are distinct species, the former double-brooded, the latter throughout its range single-brooded.

Butterflies from Spain and Russia.—Lord Rothschild exhibited a series of Lycaenidae from Spain and Italy of the *corydon-hispanus* group and also black and yellow varieties of *Pieris brassicae* from Russia.

Euploea spp. frequenting dead twigs of *Tournefortia argentea* in Samoa and Tonga.—Mr. G. H. E. Hopkins exhibited a photograph and specimens of *Euploea schmeltzi*, H.S., and *Euploea helcita mathewi*, Poulton, the males of which

frequent *Tournefortia argentea* trees in Samoa and Tonga. It is very noticeable that males alone are attracted and that the attraction appears to be almost confined to species of *Euploea*, the only exception being on one or two occasions when males of *Danais melissa melittula*, H.S., were observed in company with the Euploeas. It seems to be invariably in dead or withered twigs that the attraction lies; the flowers are apparently unattractive, but the butterflies are to be seen in swarms of many hundreds on withered fruit-clusters and broken branches. On one occasion another observer, Dr. Armstrong, saw about 150 on one broken branch, all males. Nothing in the nature of an attractive exudation was observed, and it is difficult to account for the phenomenon. The attraction is evidently selective for the male sex, since both sexes frequent various flowers, and it is almost impossible to avoid the assumption that it is some way related to sex. A tentative, but rather unsatisfactory explanation is that the scent given off by withering twigs of this tree to some degree resembles that of a virgin female *Euploea* and that the volume of the scent is so great as to mask slight differences and thus render it attractive, not to one species of *Euploea* only, but to many. It is difficult to think of any other explanation which will account for the fact that the attraction is practically confined to the genus *Euploea* and to the male sex only even in that genus.

Mr. P. A. Buxton, in continuation of Mr. Hopkins' exhibit, stated that male *Euploea* apparently frequent the tree *Tournefortia argentea* (N. O. Boraginaceae), in many islands in the South Pacific. Photographs were shown of a tree of this species growing on the beach at Whitesands, Tanna, New Hebrides; on the trunk of this tree (not shown in the photograph), there was a dead twig about six inches long, from which Mr. Buxton netted males of all the four species of *Euploea* known from Tanna. It was only the males that frequented this twig, and they fluttered about it and clung to it and to one another; at least fifteen were observed on it at one time. It was most difficult to use a net under the tree, but in spite of the difficulty, he took at one sweep with the net seven male *Euploea*, which contained representatives of all the species which occur on Tanna. None of these species was at all abundant on Tanna at the time of his visit. Collections were made at the twig, on three successive days, and the following numbers of males were taken :—

Date in 1925.	*Eupl. iphianassa*, f. *iphianassa*.	*E. iphianassa*, f. *consanguinea*.	*E. tulliolus*.	*E. torvina*.	*E. helcita lilybaea*.
22 Sept.	1	0	5	3	0
23 Sept.	1	2	1	2	1
24 Sept.	2	5	4	3	0
Total	4	7	10	8	1

In all, five visits were made on the three days, and some dozens of males of *E. iphianassa* (forms), and *E. torvina*, and a considerable number of *E. tulliolus* were seen. The *E. h. lilybaea* was the only one of its kind seen. Though males of *Hypolimnas bolina* were common, flying up and down the beach and under the *Tournefortia* tree, neither they nor any other butterfly were ever observed to join the association of male *Euploea*.

The explanation of this habit is not known. As the individuals which swarm

are invariably males, the swarming cannot depend on a sexual odour, or other attraction, unless indeed we are to charge the butterflies with homosexual lusts. It seems certain that the twig itself is the essential centre of attraction, because males of *Euploea* were never observed to swarm on other parts of the tree, or on the dead twigs of other sorts of tree. *Tournefortia* is a common tree on the strand of Pacific islands, and it is only an occasional tree which bears an attractive twig: other twigs and other trees of the same species are not even a little attractive, and one does not see a single butterfly playing round them. No trace of honey-dew, or any other foreign substance, can be detected on the attractive twigs.

Larvae of several of the species of *Euploea* of the S. Pacific are known to eat *Ficus*, and there are no grounds for supposing that *Tournefortia* is the food-plant of any member of the genus. Various butterflies, including *Euploea*, occasionally visit the flowers of *Tournefortia*, which are not specially attractive to butterflies.

The species of *Euploea*, the males of which were found associated in this remarkable manner on Tanna, could not, in Mr. Buxton's opinion, be regarded as a mimetic group. He had experienced no difficulty in recognising all the species on the wing; before he went to Tanna he had spent three months in other parts of the New Hebrides, and had never seen *E. tulliolus*; he recognised it as new to him as soon as he saw it on Tanna. Moreover, except that males congregate on *Tournefortia* twigs, the different species do not generally fly together, either on Tanna or on other islands in the New Hebrides.

Euploea iphianassa is definitely gregarious; a number of individuals of both sexes may often be found sitting, perhaps a score of them within a few square yards, nearly always in dense shade; when they are thus collected they tend to fly idly from leaf to leaf, not moving more than a few feet, and they will continue to do this even in rain. One may walk perhaps a mile before one finds another of these flocks.

Butterfly and Bird.—Mr. P. A. Buxton also showed a male *Hypolimnas bolina* (a very familiar black butterfly with a strong violet sheen, and a large round white blotch in the middle of each wing), and a specimen of the bird *Collocallia uropygialis*. This bird is a Swift, related to the species which makes the nests which are esteemed edible in China; it is black with a blue sheen, and a white rump; it is not a great deal larger than the butterfly, though bird and butterfly are quite dissimilar in shape, and in flight. It might therefore be said that bird and butterfly resemble one another a little in size, as they certainly do in colour and marking. During four months spent in the New Hebrides, where bird and butterfly are both common, he thrice saw the male *Hypolimnas* pursuing the bird, and he once saw the pursuit continued for 150 yards. He never saw this species of butterfly pursue any other bird. It is not known whether the butterfly's behaviour is determined by mere curiosity, or myopia, or what other factor.

Notes on some Mimetic Insects from the Malay Peninsula by Capt. H. M. Pendlebury.—[In the absence of the author the President communicated the following paper and exhibited the specimens referred to in it. He had shown the Diptera to Maj. E. E. Austen, D.S.O., who confirmed the author's determinations, while the *Ropalidia* had been confirmed by Mr. B. Uvarov. Dr. Perkins' interesting notes on the *Cerceris* and *Polybia* were printed as a separate communication on p. 41.]

A. Dipterous mimics of the wasp *Ropalidia* (*Icaria*) *speciosa.*

During a short collecting trip to Bukit Kutu, Selangor, in April 1926, I found a remarkable Syrphid fly which bears a close resemblance to the wasp *Ropalidia* (*Icaria*) *speciosa*, Sauss. Both the wasp and the fly were taken in exactly the same locality and at the same time of day. It may be regarded as a hypothesis that the larva of the fly lives in the nest of the wasp—a feature that has already been noted in other species of SYRPHIDAE.

The fly belongs to the genus *Paramixogaster*, Brunetti (*Fauna of British India*, Diptera, vol. iii, p. 319, 1923), and is apparently a new species.

Paramixogaster icariiformis, sp. n.

♀. Head black, frons more than half the width of the head, wrinkled, punctured, and covered with short yellowish-white pile, which is longer at the back of the head, and longest at the oral margin. Eyes black, bare, not reaching to the upper or lower margins of the head; ocelli clustered, forming a prominence on the vertex. Antennae black (except the extreme base of the third joint which is narrowly testaceous), covered with microscopic yellowish pubescence; the third joint is long, about three and a half times the length of the first joint, thickened beyond the middle and then tapering to a blunt point. Arista bare, golden brown, arising near the base of the third antennal joint.

Thorax black, closely punctured, a transverse lateral incision bordered with whitish hairs in front of the wing base. Pro- and mesopleurae punctured, covered with whitish hair; metapleura longitudinally striated.

First abdominal segment black, shining, and sparsely punctured; at the base there is a short lateral process covered with longish black hair. Second abdominal segment ferruginous red, the same width as the first segment at the base, but widening apically; on each side of the median line a subhyaline, shining, yellowish patch, which in nature gives the abdomen the appearance of being petiolate. The abdomen is widest (4 mm.) at the junction of the third and fourth segment. Third and following segments black, closely punctured, covered with black pubescence mixed with a few scattered yellowish hairs which predominate from the apical margin of the fourth segment to the apex of the abdomen. The fourth segment is nearly twice as long as the third and has a deep V-shaped emargination at its apex; apical segment of abdomen testaceous. Abdomen beneath with a deep, wide, parallel-sided groove extending from the apex of the second to the base of apical segment.

Fore-legs piceous, punctured, covered with short silvery hairs; coxae and trochanters have short ferruginous pile on the inner side; apex of tibiae and tarsi lighter, also clothed with ferruginous pile. Intermediate legs similar, but the femora have some rather long black hairs along the posterior border. Hind-legs black, punctured, covered with short silvery hairs. There is a spiral groove near the apex of the tibiae. Basal tarsal joint very long, almost as long as the four apical joints combined; tarsi covered with ferruginous pile on the inner side. Claws black.

Wings light fusco-hyaline with a broad dark fuscous stripe spreading over the third longitudinal vein and ending in an apical cloud; costal area yellowish. Halteres light yellow.

Length of body, 12 mm.; wing, 11 mm.

Malay Peninsula: Selangor, Bukit Kutu, 3500 ft., 17th April, 1926 (*H. M. Pendlebury*).

This species is allied to *P. vespiformis* (Brunetti, *tom. cit.* p. 320). It differs, however, from that species by its larger size, absence of any reddish colour on the head or thorax, comparatively shorter third joint of the antennae, and by the wing-markings.

De Meijere's *Microdon odyneroides* is also closely allied to this species. I have not seen his description, but it is figured in Von Sack's recent paper on the " Syrphiden von den Philippinen und Malaya " (*Philippine Journal of Science*, vol. 29, No. 4, p. 595, Taf. 2, figure 16, April 1926). Judging by the figure, this species should be brought into the genus *Paramixogaster*, Brunetti.

Another Dipteron, bearing a remarkable resemblance to *Ropalidia speciosa*, and belonging to the family Tachinidae * was also taken on the same day and within a radius of fifty yards of the locality of the wasp and *P. icariiformis*.

The basal abdominal segment is black, and the second and base of the third segment, ferruginous-red. The basal two-thirds of the second sternite has a subhyaline yellow patch, and this colour is continued laterally on to the tergite, which causes the abdomen to appear petiolate. The remainder of the abdomen is black, but the apical segments are covered with a short golden pile similar to that on the wasp (*R. speciosa*) and the fly (*P. icariiformis*). The wings are fuscous along the costal margin, and the apical cloud is represented by a fuscous stripe spreading over *M*1. The antennae, moreover, are held porrect in nature, in an attitude similar to that of the wasp.

I also take this opportunity of recording the occurrence of the Syrphid fly, *Milesia vespoides*, Wlk., from the Malay Peninsula. This admirable mimic of our commonest wasp (*Vespa cincta*, F.,) was taken at light in Malacca on 8.xii.1925 by Mohammed Yusop of the Agricultural Department, S.S. and F.M.S. (Ref. G., No. 25).

The species has previously been recorded from Borneo, and it is figured in " Observations on some mimetic insects and spiders from Borneo and Singapore " (*P.Z.S.*, Nov. 1902, p. 262, pl. xxii, fig. 14), a paper by the late Mr. R. Shelford, who took a specimen at Kuching.

B. Cerceris polybioides, sp. n., a mimic of *Polybia*.

Amongst an interesting collection of insects recently obtained from Bukit Kutu, Selangor, was a *Cerceris* (Sphegidae) which bore such a remarkably close resemblance to a species of *Polybia* (Vespidae), caught in the same locality and on the same day, that it was only after a careful study of the structural characters that these two wasps could be differentiated.

As the *Cerceris* apparently represents a new species, I append herewith a description of it. The *Polybia* wasp is also a new species, and is described by Mr. Cedric Dover, who has been studying the collection of Vespidae in the F.M.S. Museums.

Family Sphegidae.

Cerceris polybioides, sp. n.

♂. Black; with yellow markings as follows: basal two-thirds of the mandibles, clypeus except the narrow apical margin, interocular space to just above the insertion of the antennae, the inter-antennal carina, an oblong mark above the insertion of the antennae and in front of the ocelli, an oval mark on either side of and behind the ocelli, the cheeks except for an emargination of the inner side; the pronotum except a small wedge-shaped mark in the centre, the tegulae except for two small spots at extreme base; the metanotum with a suboval mark divided medially and constricted laterally, the scutellum, the sides of the median segment, the

* Maj. Austen considers that this Tachinid probably belongs to a new genus, near *Ocyptera*.—E.B.P.

prosterna, pleurae, sternite of the first abdominal segment (this colour is continued and shows laterally at the base of the tergite and the sternite of second abdominal segment), and a subquadrate spot at the base of the tergite, and an interrupted line on the apical margin; a broad line on the dorsal surface at the apical margin of the third abdominal segment; a thinner line on the fourth and fifth segments; a wider band on the sixth segment, and the pygidial area as far as the apical third; sternites of abdominal segments three to six.

Fore-legs, except for marks on the outer side of femora; intermediate legs, except for a small mark at the base of the coxae, and more extensive markings on the outer side of the femora; hind-legs, except apex of coxae, inner sides of trochanters and femora, apex of tibiae, first and apical tarsal joint, yellow.

Tip of the apical segment of antennae ferruginous.

Lamellae free from base; clypeus about twice as broad as long, truncate at apex, with shallow, small punctures, and covered with silvery pile. Head coarsely punctured, with yellowish hair arising from each puncture, some longer hair between the ocelli.

Thorax, abdomen, and legs covered with short sparse yellowish hair, hind tibiae spinose above.

Pronotum smooth and shining; mesonotum longitudinally striated; metanotum sparsely punctured. Median segment smooth, shining; enclosed area shining, with a few scattered punctures; some transverse striae at the sides and apex.

First abdominal segment petiolate, as long as the second and third combined, shining, and with a few scattered punctures; second and following segments closely and minutely punctured.

Pygidial area coarsely punctured, ovate, and truncate at apex.

Wings slightly iridescent, hyaline, smoky, radial cell and apex rather darker; stigma and nervures dark brown.

Length, 10 mm.; fore-wing, 9 mm.

Malay Peninsula: Selangor, Bukit Kutu, 3500 ft., 19th April, 1926 (*H. M. Pendlebury*). Holotype ♂.

The new *Polybia* mimicked by *Cerceris polybioides*, sp. n., is described below by Mr. Cedric Dover.

Polybia pendleburyi, sp. n.

This species is very closely allied to *Polybia sumatrensis*, Sauss., but is constantly smaller, more slender and darker, and shows other differences also by which it may be readily separated. These are as follows :—

Polybia sumatrensis.	*Polybia pendleburyi.*
Length about 13 mm.	Length about 10 mm.
Wings hyaline, stigma ferruginous, costal margin yellowish.	Wings hyaline, stigma dark fuscous, costal margin and apex dark, not yellowish.
Inter-antennal space prominently raised.	Inter-antennal space only slightly raised.
Prosternum entirely yellow.	Prosternum black, except for a very narrow bracket-shaped yellow marking on the inner margin of each piece.
Mesosternum entirely yellow.	Mesosternum entirely black.
Mesonotum unmarked.	Mesonotum with a minute elongate yellow spot in the middle posteriorly.
Postscutellum entirely yellow.	Postscutellum with two more or less rectangular markings (rounded posteriorly) anteriorly, which are distinctly separated from each other in the middle.

Polybia sumatrensis.	*Polybia pendleburyi.*
Petiole and abdomen above brownish; underside in all specimens uniformly pale yellowish.	Petiole and abdomen above intense black; ground-colour of the underside in all specimens similar. The underside of the petiole has two narrow yellow lines (which are a continuation of the transverse yellow apical dorsal band) reaching from the apex to a little beyond the middle. The underside of the abdomen has indefinite greenish-yellow markings on the middle of sternites 1–4.
Basal abdominal segment with a transverse yellow marking apically.	Basal abdominal segment with a similar marking, but the colour in all specimens is olive-green.
Anterior and intermediate legs, except intermediate tarsi, more or less uniformly yellow.	Anterior and intermediate legs conspicuously variegated with black, a stripe along the outside of the femora being especially prominent.
Posterior coxae entirely yellow.	Posterior coxae with black markings at base, both in front and behind.
Posterior tibiae entirely yellow, except for a very narrow black band at base and apex.	Posterior tibiae yellow only in the middle with a conspicuous black band at base, and apical third black.

In other respects *P. pendleburyi* agrees very well with *P. sumatrensis* * in the markings on the face, puncturation, etc., but the differences mentioned give the former species such a characteristic facies that it may be readily separated even at a glance. The *Cerceris* mimic, moreover, has little general resemblance in the cabinet to *P. sumatrensis*, though it might easily be mistaken for *P. pendleburyi*.

P. pendleburyi is represented in the collection of the F.M.S. Museums by six specimens from the following localities:—Bukit Kutu, Selangor, 3500 ft. (*H. M. Pendlebury*: 14 and 19.4.26); Jor Camp, Batang Padang, Perak, 1500 ft. (*H. M. Pendlebury*: 28.5.23); Gunong Benom, Pahang, 3000 ft. (*I. H. N. Evans*: 23.7.25); Bukit Cherakah, Kuala Lumpur (*H. M. Pendlebury*: 27.7.21); Gombak Valley, Selangor, 1200 ft. (*H. M. Pendlebury*: 5.8.22). Holotype ♀ from Bukit Kutu, 19.4.26.

Notes on the resemblance of *Cerceris* (Fossores) to a true wasp (Vespidae), by Dr. R. C. L. Perkins, F.R.S.—The President said that he had sent the Hymenoptera Aculeata received from Capt. Pendlebury to Dr. Perkins, who had written the following interesting notes on the resemblance between the *Cerceris* and the *Polybia*:—

"6 *October*, 1926.—Of course it is not usual for a *Cerceris* to have a long thin petiole like the *Polybia*. It is a very remarkable species. I have noticed that in Malaya and elsewhere the *Cerceris* tend to resemble true wasps, whether solitary (i.e. Eumenidae) or social (Vespidae), in colour-patterns. So far as I know our British *Cerceris* do not sting at all. I have handled hundreds of females of our large *C. arenaria*, L., but I have never been stung, while of course all the real wasps sting hard—even some of the very small social species.

"12 *October*, 1926.—It is very curious about those big formidable-looking

* *Cf.* Bingham, *Fauna Brit. Ind. Hym.*, I, p. 385, 1897.

wasp-like species of Fossors, *Cerceris*, the big Crabros, and I believe *Philanthus* and many others (some even of huge size). *Cerceris* can prey on stinging bees of good size, as well as stinging also the hardest weevils, while *Philanthus* goes for the hive-bee and *Crabro* will knock out a large Syrphid or a Sarcophagid fly instantaneously with its sting. Yet when one handles them they apparently never sting, and of course it cannot be because the weapon lacks the power of penetration, for even some species of quite small bees such as *Halictus* or *Hylaeus* can easily make themselves felt on the softer parts of the hand. Unlike bees or social wasps or Eumenidae, these Fossors seem unwilling to use the sting at all for defence, as though their colour was so effective as to be all-sufficient for protection. Yet Shuckard recorded that on Hampstead Heath *every autumn* a flock of wagtails came and finished off all the members of colonies of the big *Cerceris arenaria* that were still on the wing.

"I have never myself seen any bird eating this Fossor, though at times every thistle and bramble-blossom has one or more individuals settled upon them, here on the S. Devon coast—but negative evidence in such a case is of little value.

"14 *October*, 1926.—Referring again to those big *Cerceris*, etc., which do not sting, is it possible that they really have very little poison and therefore never use their sting except on their prey? Perhaps Mr. O. W. Richards has examined the stings and poison-glands of some of these Fossors. A tiny social wasp (*Icaria* sp.) I got mixed up with in Queensland laid me up after about half a dozen stings! It was probably not half the size of a ☿ *Vespa vulgaris*."

Dr. R. J. Tillyard, F.R.S., gave a lecture on Fossil Insects, illustrating his remarks with many striking lantern slides. He directed attention principally to the numerous discoveries made in recent years, and throwing light upon insect evolution and phylogeny during the geological periods immediately following the Carboniferous.

Wednesday, November 3rd, 1926.

Professor E. B. Poulton, F.R.S., President, in the Chair.

Election of an Honorary Fellow.

Dr. Geza Horvath, of Budapest, Hungary, was elected an Honorary Fellow of the Society.

Election of Fellows.

The following were elected Fellows of the Society:—Colonel G. H. Evans, C.I.E., C.B.E., c/o National Bank of India, Ltd., 26, Bishopsgate, E.C. 2.; Dr. I. M. Puri, Central Research Institute, Kasauli, Punjab, India; Mr. J. C. Robbins, The Rosery, Limpsfield, Surrey.

Exhibits.

Dragonflies from Samoa.—Mr. P. A. Buxton exhibited a number of Samoan dragonflies and said:—

"Twenty-seven Odonata are known from Samoa, and collections have been recently determined by Major F. C. Fraser. Of the fifteen Anisoptera, twelve are species of wide distribution, and presumably immigrants to Samoa and to many other

isolated island groups. One of these forms, *Hemicordulia assimilis oceanica*, Selys, is perhaps the parent of the two species at present only known from central Polynesia; these are *H. pacifica*, Fraser, known from Upolu and Tutuila Islands, Samoa, and from Vavau and Nukualofa, Tonga, and *H. cupricolor*, Fraser, only known from the mountains of Upolu Island, at about 2000 feet.

" Of the twelve Zygoptera, the majority are endemic, and the forms which are not endemic are derived from Fiji or New Caledonia and are not insects of wide range. The only exception within the Suborder is *Ischnura aurora*, Brauer, known from India, and thence eastwards to the central Pacific; this species is distributed by wind, and in Coorg, India, Fraser has seen specimens take flight soon after emergence, and rise almost perpendicularly in the air till they passed out of sight. Of the endemic forms, the most interesting are a group that according to Fraser ' appears to represent the root of the genus *Ischnura*.' Primitive species of *Ischnura* are found in Samoa, and also two endemic Ischnuran genera, *Amorphostigma* and *Pacificagrion*.

" The greater number of the endemic Ischnurans are at present only known from a little below 2000 feet, in the neighbourhood of Malololelei, island of Upolu. The country is basalt, divided by many deep and precipitous ravines, and densely clothed with thick forest, which is difficult to penetrate. In the only ravine in which collecting has been steadily done no less than six of these forms have been found, all of them in less than half a mile (*Amorphostigma armstrongi*, Fras., *Pacificagrion lacrymosa*, Fras., and four Ischnurans, the description of which will shortly be published). Of these six insects *A. armstrongi* is widely distributed in Upolu, but the others are at present known only from this half-mile of ravine. It is possible that in other ravines, even within a mile of this one, there may exist undiscovered endemic forms, and perhaps some of the forms will be found to be endemic in particular ravines; but as so many of these related forms have been found in one place, it seems that isolation cannot have been a factor in their evolution.

" A similar phenomenon is known from Fiji. According to Tillyard (*Trans. Ent. Soc. Lond.*, 1923, p. 313), the genus *Nesobasis*, Selys, is peculiar to Fiji, except that one species is known from Bivak Island, S.W. New Guinea. Of the fifteen Fijian species, no less than nine were taken by Mr. H. W. Simmonds, in the Waidoi River, island of Viti Levu; though it is not recorded that all these were taken in a short stretch of the river, the occurrence of so many forms in one valley seems to show that here also isolation has not been necessary for the production of new species."

Butterflies from the Sudan.—Dr. G. D. Hale Carpenter exhibited and made remarks upon a collection of butterflies from Mongalla Province, S. Sudan.

R. Kelly's notes on gall-formation by Australian Thysanoptera.—The President, in the absence of the author, Mr. F. Laing, brought forward the following communication :—

" Mr. R. Kelly, of Melbourne, in recent letters to Professor Poulton, has put forward some very interesting observations on the question of the gall-formation of certain species of Australian Thysanoptera. In the majority of cases Thysanoptera, especially those belonging to the Suborder Terebrantia, probably pass the

winter in the soil; but certain Tubulifera, which are usually spoken of as 'gall-makers,' are apparently erroneously described as such, for they really utilise as winter homes the galls made by other insects, emerging therefrom on fine sunny days during the cold months and on the approach of spring laying their eggs on the leaves of their host-plants on which the complete metamorphosis takes place. His reasons for such a hypothesis—his observations are based upon a true gall found on the stem of *Cassinia aculeata* and on a nest-like affair composed of web and bits of stick and leaf found on *Bursaria spinosa* and made by *Austrothrips bursariae*, Bagn. (sp. n.)—may be put briefly as follows. The galls are made towards the end of autumn, the exit hole and the ejecta are much bigger than would be made by or belong to the thrips, the latter bigger in fact than the thrips itself; elytra are found in the cavity of the gall and beetles are always found in or around the gall, but what is the most conclusive evidence of all is the fact that immature stages of thrips are never found in the galls but instead what look like the cocoons of beetles. The mere fact that thrips are found in galls does not imply that the thrips is the causal agent of the gall any more than, though thrips are found in the webs of spiders, they themselves are web-spinners.

"His observations concerning another species of thrips found on *Eucalyptus sideroxylon* at Bendigo are also worth putting on record. The imago eats its way through the seed-capsule at the base of the stamens and deposits its eggs amongst the ovules which, as small gelatinous specks, they much resemble—so much so in fact that it requires careful scrutiny to distinguish the two. The newly hatched larvae look like whitish bitten-off pieces of the ovary, the nymphs are colour-protected by the walls of the ovary itself, while the imagines closely resemble faded pieces of stamens which have fallen into the cavity of the seed-capsule. Each stage in the development of the thrips, which belongs to the Aeolothripidae, is protectively coloured. The species, in addition, illustrates the initial efforts at gall-formation; for the imago, in eating into the soft tissue of the flower and hollowing out the pulpy ovary, sets up a callus-growth. How far it is assisted by another species—a *Haplothrips*—has yet to be elucidated, but there would appear to be some association between the two, and it may be, as Mr. Kelly suggests, that the *Haplothrips* does the preliminary work, acting as another 'Australian digger' as he quaintly puts it."

Examples of the modified seed-capsules of *Eucalyptus sideroxylon* were exhibited to the meeting.

The proof by W. A. Lamborn that the larva of the mimetic *Hyperechia bifasciata*, Grünb. (Asilidae), preys on the larva of its Aculeate model *Xylocopa inconstans*, Sm., in Nyasaland.—The President communicated the following record of observations and exhibited the specimens referred to, which had only been received a few days earlier from his friend, Mr. W. A. Lamborn. The Diptera had been kindly determined by Major E. E. Austen, D.S.O., and the Hymenoptera of this and the succeeding communication, by Mr. B. P. Uvarov.

"*Fort Johnston, Nyasaland.* 14*th September*, 1926.

"I have now carried out an investigation parallel with that conducted at Nairobi by Dr. V. G. L. van Someren on the relation between *Hyperechia* and

Xylocopids and have confirmed the striking discovery he made, that the larvae of the former feed on those of the latter. I have found larvae which I am confident must be the Asilids devouring those of the Xylocopid. But they have never pupated, having burrowed far into the wood surrounding the bees' tunnel. Their progress has been amazing, for they look soft weak things. However, I found also in tunnels of similar calibre near those of the bee two puparia, one of which has afforded the Asilid, and so I am confident that I shall soon unravel the little mystery. The puparium has a remarkable head armament, and will be worth describing, I think, if new to science. I will get a larva also, though it will be difficult to preserve its natural colour.

"18*th September*, 1926.

"I have now unravelled the main points of interest in the life-history of the *Hyperechia* Asilid. Its larva does actually feed upon the grubs of the bee. So long ago as April I collected a number of large dead branches, keeping them on the verandah where I anticipated that the Xylocopids would ultimately make use of them. Towards the end of a couple of months quite a colony had become established, but I had difficulty at first in obtaining any nests, being forestalled by squirrels, who quickly gnawed away the wood so as to eat out the masses of pollen stored by the bees. On 20th July I decided to open up some of the tunnels, and found in the first a pupa of the bee which afforded an imago (845) on 10/8/26 [*Xylocopa inconstans*, Sm., ♀]. In the cell adjacent to this was another pupa which afforded on 16/8/26 a bee of different appearance and golden in colour [*X. inconstans*, ♂]. In a second nest (854) there were three cells, the lowest tenanted by a pupa which has turned out to be that of the golden [male] bee; the second contained a pupa of the [female] Xylocopid; the third was empty, but above it, at a distance of about half an inch and to one side, there was a cavity occupied by a pupa which I was convinced must be that of the Asilid, although I could find no tunnel between it and the nest. This pupa gave rise to one of the Asilids on 15/9/26 [*Hyperechia bifasciata*, Grünb., ♂].

"As both bee-pupae died I have restored them with the pupa-case of the fly to their original position in the piece of wood, which I now send. The tunnel at the back of this is unconnected with the particular specimens.

"In the third nest (847) there was a single Xylocopid pupa which produced the imago [*X. inconstans*, ♀] on or about 7/9/26, and in an adjacent separate chamber was an Asilid pupa from which the imago [*H. bifasciata*, ♂] emerged on 3/9/26. In a fourth nest (842) with three cells I found larvae of the Xylocopid, but attached to one was a predaceous larva quite as large as itself which completely sucked away the substance of its host within a couple of days, leaving a mere semitransparent cuticle (now sent). I removed the parasite to a box in the expectation that it would soon pupate, but though it crawled about a little, no change had taken place by 10/8/26, when I placed it in one of the bees' cells. From this it quickly bored its way into the surrounding wood, disappearing from view in less than 24 hours. I opened up the tunnel from time to time, finding the larva unchanged, though it continued to bore farther and farther, and on 12/9/26 I placed near its mouth-parts a small larva of the Xylocopid. This had disappeared entirely on 15/9/26 when I found that the parasite had just pupated, the pupa being similar to

those which had afforded the Asilids. The chain of evidence is, therefore, complete. (The tunnel at the *back* of the piece of wood labelled (854) was made by this larva).

" In a fifth nest I found another Asilid larva also feeding on a larva of the Xylocopid. This also tunnelled in wood until a few days ago, when I put it in preservative (alcoholic perchloride solution). With this I send also the skin of its victim (in matchbox).

" I was for long quite at a loss to understand why the two larvae of the Asilid were so long in pupating. It would seem, however, that just one larva of the bee cannot provide nutriment enough to enable that of the parasite to grow to maturity, so that the latter has to seek others, and can tunnel even to a nest some little distance away in the same branch, it being usual for the bees to nest near each other. The pupa of the parasite, lying in a cavity outside the Xylocopid tunnel, is furthermore protected from interference by emerging bees. I was amazed at the ease with which soft Asilid larvae tunnel, filling up the cavity behind them with detritus as they go. The formidable-looking armament on the head of the pupa can only be used, I imagine, for the purpose of enabling it to work its way to the exterior, though how it does this I have yet to learn. By the way, have you observed the striking similarity between this armament and that on the head of the pupa of some Aegeriids and Bombyliids—insects that may have to force their way similarly through tunnels in wood to the exterior prior to emergence? I have some material to show this, particularly the pupa-case of a very fine Bombyliid bred from the nest of a small Hymenopteron, unsecured as yet.

" Another point to which I hope to give attention when I can, is the means by which the egg of the *Hyperechia* is laid so that the young larva is enabled to reach the host."

The mimetic association between *Hyperechia bifasciata* and the female of *Xylocopa inconstans* had been observed by Mr. A. Loveridge at Kilosa, Tang. Terr. (*P.Z.S.*, 1923, p. 1014), and specimens collected by him were represented in figs. 7 and 8 of pl. B, in *Proc. Ent. Soc. Lond.*, 1925. The larva of the following species of *Hyperechia* had now been proved to prey upon the larvae of their Xylocopid models :—(1) *H. nigripennis*, Wied. : Willowmore, Cape Colony. On the evidence of the contents found in the digestive tract of a larva taken from wood tunnelled by its model (*Trans. Ent. Soc. Lond.*, 1924, pp. 126–129); (2) *H. xylocopiformis*, Walk. : Bangalore, S. India. Proved by Dr. Kunhi Kannan (*Proc. Ent. Soc. Lond.*, 1926, pp. 1, 2); (3) *H. bifasciata*, Grünb. : Ft. Johnston, Nyasaland. Now proved by Mr. W. A. Lamborn. Furthermore, the larvae of *H. consimilis*, J. G. Wood, were discovered by Dr. S. A. Neave " in the same tree-trunk as a colony of its model *Xylocopa nigrita*," F. (*Proc. Ent. Soc. Lond.*, 1914, p. xxxvi; *Trans.*, 1924, pp. 121, 122). Considering the evidence afforded by the first-named three Asilids, Dr. Neave's observation renders it almost certain that the larvae of *H. consimilis* also devour those of the Xylocopid model. Thus, omitting *H. marshalli*, Austen, of which the larva is unknown, all the E. African mimetic Hyperechias shown with their models on plates B and C of *Proc. Ent. Soc. Lond.*, 1925, are known to pass the larval state in wood tunnelled by Xylocopid bees, and all except *H. consimilis* to feed on

Xylocopid larvae. The existence of the above-described association between the larva of the mimic and that of its precise model in so large a proportion of the known examples leads to the conclusion that further observations in the Nairobi district will show that the larvae of *H. bifasciata*, Grünb., and *H. imitator*, Grünb., also prey upon those of their models, although up to the present Dr. V. G. L. van Someren has only found them in and near the tunnels of other Xylocopid bees (*Trans. Ent. Soc. Lond.*, 1924, pp. 122–124).

W. A. Lamborn's observations on the Chrysid parasites of an Aculeate, probably *Synagris*, in Nyasaland.—The President communicated the following notes made by his friend Mr. W. A. Lamborn, and exhibited the fourteen female specimens of the Chrysid, *Stilbum cyanurum*, Först. :—

"*Fort Johnston, Nyasaland.* 18 *September*, 1926.

"In the material which I am now sending there is also a series of Chrysids [*Stilbum cyanurum*] that have interested me greatly. They are numbered (846) and were bred from a mud nest, probably that of a *Synagris*; for I found in it the remains of Hesperid larvae. This was found on 3/9/26, at the Bua River, in about 33° 20′ E.; 13° 50′ S. (about 3200 ft.). The nest, which was spherical and about the size of a Tangerine orange, had apparently been attached to a grass-stem that had been consumed by a bush-fire; for it was lying on the ground, rather scorched. On the outside were a number of little funnel-shaped holes leading to the interior, and on breaking it open I found sixteen cocoons of a Chrysid, there being no other insects at all. I have often noticed these openings before, but have never been able to find out how they are made. The Chrysid parent had evidently been responsible. I am sending fourteen of the insects—all females—that emerged."

The labels recorded that the Chrysids emerged on the following dates in 1926 :—Sept. 8th—3; 9th—1; 10th—3; 11th—2; 12th—3; 13th—1; 14th—1.

The Euploeine associations of the New Hebrides and their relation to those of Fiji.—The President said that, having been unable for want of time to comment on Dr. P. A. Buxton's most interesting exhibit and description of the Euploeine association of Tanna I., New Hebrides, at the last meeting (*Proc.*, p. 36), he had again brought the specimens referred to, as well as lantern illustrations of corresponding associations in other places. These were exhibited to the meeting and showed that the Euploeas of S. India, the Philippines, New Guinea, Solomons, etc., possessed in each of these localities a common pattern which differed from that in the other localities. The local resemblances could not be explained as an expression of affinity. Thus each association included Euploeas with males bearing one or two scent-patches on the fore-wing and a pair of anal scent-distributing brushes, but also Euploeas (placed by Moore in the genera *Salpinx* and *Calliploea*) with a male scent-patch on the hind-wing protected by a specially developed flap of the fore-wing, and possessing two pairs of anal brushes. In Dr. Buxton's association from Tanna, *Euploea torvina* belonged to the first of these groups while *E. iphianassa* and *E. tulliolus* belonged to the second. Dr. Buxton considered that the association

was not mimetic because "he had experienced no difficulty in recognising all the species on the wing"; but in such a combination, in one locality, of several butterflies all distasteful and presumably equally distasteful, advantage would be gained if the pattern of A resembled that of B sufficiently to recall a previous unpleasant experience following an attack upon B. It was by no means necessary that A and B should be mistaken the one for the other, although such a result is doubtless finally attained in numerous examples of mimicry.

The massing of Euploeas on a single dead twig was extremely interesting and it was hoped that the subject would be further investigated. The observation appeared to be a special manifestation of the tendency to collect in crowds on a single tree already recorded (but not in relation to sex) in other DANAINAE, e.g. *Danaida plexippus*, F., in N. America, and its Old World ancestor *D. genutia*, Cram. (*plexippus*, L.), in India (*Trans. Ent. Soc. Lond.*, 1905, p. 92). It would be interesting, in such instances as that described by Dr. Buxton, to observe the result of removing the dead twig piecemeal, and of attaching portions of it to other trees and other parts of the same tree.

Dr. Buxton's captures of Euploeas on Tanna were of special interest and value in their bearing on the origin of the Fijian associations, discussed in *Trans. Ent. Soc. Lond.*, 1924, pp. 580—604. The conclusions there reached were strongly supported by the discovery that the whole of the Fijian Euploeas except the white-patterned *E. boisduvalii proserpina* were represented in the Tanna association by nearly identical forms. Furthermore, no *Euploea* except these representatives had been known to be taken on Tanna, although it is probable that a form of *E.* (*Stictoploea*) *tristis*, Butl., exists in the island and possibly *E.* (*Saphara*) *jessica*, Butl. Whatever Euploeas may be hereafter discovered in the island, the predominant species were clearly those which clustered on the dead twig at Whitesands. Of these by far the rarest was *E. helcita lilybaea*,* Fruh., closely similar to the W. Fijian *E. h. eschscholtzi*, Feld. Of the three other species *E. torvina torvina*, Butl., could barely be distinguished from the E. Fijian *E. boisduvalii mangoensis*, Butl. (*simmondsi*, Poult.); the strong-patterned forms of *E. tulliolus*, F., from the W. Fijian *E. t. forsteri*, Feld.; the weak-patterned from the E. Fijian *E. t. protoforsteri*, Poult.; the strong-patterned *E. iphianassa*, Butl., f. *iphianassa*, from the W. Fijian *E. nemertes macleayi*, Feld.; the weak-patterned f. *consanguinea*, Butl., from the E. Fijian form of *E. n. macleayi*. It will be observed that, whereas the strong and weak patterns are segregated respectively in the west and the east of Fiji, they occur together on Tanna. *Euploea seriata*, H.-S., closely similar to the weak-patterned forms of *tulliolus*, appears to be the only representative † of this species on Lifu and Maré in the Loyalty Islands (*Trans. Ent. Soc.*, 1924, p. 600) to the west of Tanna, just as in E. Fiji to the east, although, as above stated, the strong-patterned forms are also segregated to the east (in W. Fiji).

The Euploeas of Tanna, so far as they could be traced, are tabulated on p. 49. The following collectors are represented by their initials :—Commander J. J. Walker,‡ Dr. P. A. Buxton, and Dr. W. Armstrong.

* Unfortunately mis-spelt *lilybara* in the above-mentioned paper.

† The locality of a single strong-patterned ♂ labelled "Mahé" (evidently intended for Maré) at Tring requires confirmation.

‡ See his paper in *Ent. Monthly Mag.*, xxxviii (1902), pp. 189–203.

Dates of capture and initials of collector in Tanna I.	*E. helcita lilybaea*, Boisd.	*E. torvina torvina*, Butl.	*E. tulliolus*, F.		*E. iphianassa*, Butl.		Notes.
			Strong marginal pattern.	Weak marginal pattern.	Strong marginal pattern : f. *iphianassa*.	Weak marginal pattern : f. *consanguinea*, Butl.	
J.J.W. 14 Aug. 1900. Wea Sisi Bay : 0–100 ft.					1 ♂	1 ♂, 1 ♀	♂ *iphianassa* and ♀ *consanguinea* transitional. ♀ very like *graeffiana*. ♂ *consanguinea* referred to in *Tr. Ent. Soc.*, 1924, p. 602, n.
P.A.B. 9 Sept. 1925.			1 ♂	1 ♀			
,, 15 ,, ,,		1 ♀					
,, 19 ,, ,,	1 ♂					1 ♀	Transitional ♀.
P.A.B. 22 Sept. 1925. At Whitesands.		3 ♂	3 ♂	2 ♂	1 ♂		All on one dead twig of flowering tree on foreshore. Distinct broad beak-mark on L.F.W. of *iphianassa*.
P.A.B. 23 Sept. 1925. At Whitesands.	1 ♂	2 ♂	1 ♂		1 ♂	2 ♂	On same dead twig : captured in one sweep of net.
P.A.B. 23 Sept. 1925. At Whitesands.		3 ♂	1 ♂		1 ♂	3 ♂	Distinct narrow beak-mark on L.F.W. of *tulliolus*.
P.A.B. 24 Sept. 1925. At Whitesands.		3 ♂	2 ♂	2 ♂	2 ♂	5 ♂	On same dead twig as the 9 and 7 specimens above. One *consanguinea* somewhat transitional.
W.A. 1926.			2 ♂, 1 ♀	2 ♀		1 ♂, 1 ♀	
Totals.	2 ♂	11 ♂, 1 ♀	10 ♂, 1 ♀	4 ♂, 3 ♀	6 ♂	12 ♂, 3 ♀ (2 ♀ intermediate.)	

Comparison with the recorded Fijian Euploeas shows that the proportions are very different from those of Tanna, especially in the rarity of *E. helcita lilybaea* and the relative abundance of *E. tulliolus* and the forms of *iphianassa*. Nevertheless the resemblance as a whole is so close that it can hardly be doubted that the Tanna association is representative of the forms which invaded Fiji.

Tanna is one of the three southernmost islands of the New Hebrides and it is important to ascertain whether its Euploeas are similar to those of Erromanga to the N. and Aneiteum to the S. From Erromanga the only ascertained records are a ♀ *E. helcita lilybaea* and a very strong-patterned ♀ *tulliolus* both in the British Museum and taken by W. W. Perry on 10 May, 1875. It is unfortunate that more Erromanga Euploeas are not known, for it is possible that some of the forms may exhibit a transition towards those of the islands immediately to the north.

The far more abundant material from Aneiteum in the British Museum is closely similar to that of Tanna. It includes a ♂ *helcita lilybaea*; 1 ♂ and 2 ♀ of *torvina*,* the ♂ being Butler's type of this species, and one ♀ being his type of *paykullei*; 1 ♂ strong-patterned *tulliolus*; finally 1 ♂ and 2 ♀ of the strong-patterned form

* There is also a ♂ *torvina* labelled "Aneiteum" in the Hill Museum.

iphianassa, including Butler's ♂ and ♀ types, also 1 ♂ and 4 ♀ of the weak-patterned form *consanguinea*, including his ♂ and ♀ types; in addition to these the ♂ type of *E.* (*Stictoploea*) *tristis*, Butl. Omitting this last species, which appears to have been influenced in pattern and to some extent in form, by the presence of *tulliolus*, the known Euploeas are the same as those of Tanna.

The known representatives of *E. tulliolus* from the Loyalty Is. to the west of the southern New Hebrides have already been mentioned. In addition to this species, *E. torvina rileyi*, Poult., is apparently common in Lifu, 18 ♂ and 12 ♀ existing in the British, Hill, Tring, and Oxford Museums. This race is very similar to *torvina torvina*, but is somewhat smaller. *E. t. rileyi* is accompanied in Lifu by *E. schmeltzii whitmei*, Butl., which would probably be indistinguishable from it on the wing. *E. s. whitmei* and its close ally *schmeltzii*, H.-S., of W. Samoa are well-known examples of discontinuous distribution (*Trans. Ent. Soc.*, 1924, pp. 596, 597). The weak-patterned representative of *tulliolus* and the still darker *rileyi* and *whitmei* form the Loyalty Euploeine association of which the two first-mentioned members are very near the corresponding forms on Tanna. *E. s. whitmei* appears to be represented on Maré by a distinct race.*

In New Caledonia, still further to the west, *E. helcita helcita*, Boisd., closely resembling the New Hebridean *lilybaea*, is extremely common and long series exist in each of the four above-mentioned museums. Euploeas apparently indistinguishable from *rileyi* and *whitmei* occur, but seem to be rare; as also a weak-patterned form near *tulliolus*. An interesting link with Tanna and Fiji is provided by a ♂ *E. iphianassa* of the strong-patterned form *iphianassa*, captured by Commander Walker at Noumea in July 1900. Three examples of *E. tristis* (2 ♂ 1 ♀) and one ♀ *E. jessica*, labelled New Caledonia in the British Museum, require confirmation. All four were originally in the Druce Coll., together with a ♂ *jessica* labelled Fiji and unfortunately made the type of this form and recorded from the erroneous locality by the late Dr. A. G. Butler.

The additional facts here recorded, and especially our increased knowledge of the Tanna Euploeas, show that the Fijian associations hardly differ, except in the proportions of the constituent forms, from those of the two southernmost islands of the New Hebrides. Furthermore in the Torres Islands, forming the northward extension of the great chain which includes the Banks Islands and the New Hebrides, two of the chief Euploeas of Tanna and Fiji exist almost unchanged as *E. fraudulenta*, Butl., similar to although larger than *torvina*, and *E. iphianassa* similar to the Tanna and Aneiteum form, and placed with it in the British Museum. These Euploeas had been compared in the paper already refered to (*ibid.*, pp. 592–596, 601–604), where it is shown that the male armatures of the two forms in the Torres Is. resemble respectively those of the two corresponding forms in the New Hebrides and in Fiji. Since the appearance of this paper, further material from the Torres Is., rendered available by the kind help of Commander Walker, has been studied with confirmatory results and with the additional interesting conclusion that forms

* *Euploea schmeltzii maréensis*, n. s.-sp. A male and female of this race, labelled in error "Mahé," exist in the Tring Museum. They are somewhat larger and distinctly darker than *whitmei* from Lifu, and the dark tint does not become paler towards the margin as in the latter race, this difference being especially marked in the H.W. The ♂ brand is larger than in average examples of *whitmei*.

Type ♂, paratype ♀, in Zool. Mus., Tring.

corresponding to *consanguinea* exist in the north as well as those corresponding to *iphianassa*. The Torres Is. in which Commander Walker collected were Tegua, Hiu, and Lo (*Ent. Monthly Mag.*, xxxviii, 1902, p. 189).

A mass of additional information has also been forthcoming concerning the Euploeas of the Banks Is. and the New Hebrides north of Erromanga. The fine material collected by Mr. H. W. Simmonds (1923) and Dr. P. A. Buxton (1925) has now been studied side by side with that of Commander J. J. Walker * (1900), Mr. J. R. Baker (1922–23) and the following naturalists :—

W. W. Perry (1875)—British Museum.

G. F. Mathew (probably 1880–1885)—British Museum.

C. M. Woodford (1886)—British, Oxford, and Tring Museums. The captor has kindly furnished the precise dates from his diary.

A. Corrie (presented 1875)—British Museum.

All the above are indicated by their initials in the tabular statement on pp. 52, 53, one or two additional surnames being added in full.

The islands are arranged in a general north-to-south sequence, the only exception being due to the placing of a satellite, Malo, immediately after its large neighbour Santo, although a strict adherence to the above principle of arrangement would place Aoba between the two. One of the Banks Is. visited by Mr. Simmonds was named by him " Pakea," which my friend Dr. A. R. Hinks, F.R.S., thinks must be Kakea, a " low flat-topped islet encircled by a reef, and about a mile from what is called South Point, but might better be called East Point of Vanua Lava."

The following specimens in the Hill Museum were examined after the table had been printed :—

Oba [Aoba], Lolopuépué—5 ♂ *torvina bakeri*, 6 ♂ 4 ♀ *graeffiana*, 5 ♂ *tristis*.

Abo [Aoba]—2 ♀ *torvina bakeri*, 1 ♂ *graeffiana*, 2 ♂ 1 ♀ *tristis*.

Mallicolo—4 ♂ *torvina bakeri*, 4 ♂ *graeffiana*, 5 ♂ 1 ♀ *jessica*.

A pair of *torvina bakeri* are labelled " New Caledonia," probably in error; as also a ♂ *jessica* from the Grose-Smith Collection (cf. p. 50).

The table on pp. 52, 53 proves that the two commonest Euploeas, *bakeri* and *graeffiana*, form a very definite brown-winged association in many, and probably in all, islands of the long chain between the Torres Islands and Erromanga. It is probable that the approach has been reciprocal, but chiefly from the side of *graeffiana*; for *bakeri* is shown to be rather more numerous and belongs to a group of species which appears to vary readily in the direction of a brown coloration. Furthermore, in Tanna and Aneiteum its representative, *torvina*, still exhibits a brownish shade, brighter than the warm sepia of *iphianassa*, the representative of *graeffiana*.

The *bakeri-graeffiana* association appears to be compact and self-contained, unaffected by the other three much less common Euploeas, of which *helcita libybaea* and *tristis* were the rarest in the material studied and tabulated. It must be remembered, however, that *jessica* would be still rarer but for Mr. Simmonds'

* For an account of Commander Walker's visits to the Torres Is., Banks Is., and New Hebrides see *Ent. Monthly Mag.*, vol. xxxviii, 1902, pp. 189–203. A general description of Commander Walker's and Mr. Baker's examples of *E. torvina bakeri*, n.s.-sp. (*paykullei*), and *E. graeffiana*, recorded in detail in the table on pp. 52, 53, is given in *Trans. Ent. Soc.*, 1924, pp. 592, 601.

	I.lands (generally from N. to S.) and initials of collector.	Date.	*Euploea torvina bakeri*, n.s.-sp.* (*paykullei*, auct.). ♂	*Euploea torvina bakeri*, n.s.-sp.* (*paykullei*, auct.). ♀	*Euploea* (*Salpinx*) *graeffiana*, Herr.-Sch. ♂	*Euploea* (*Salpinx*) *graeffiana*, Herr.-Sch. ♀	*Euploea* (*Stictoploea*) *tristis*, Butl.	*Euploea* (*Saphara*) *jessica*, Butl.	*Euploea helcita lilybaea*, Fruhst.
BANKS ISLANDS.	Ureparapara (J.R.B.). 0–25 ft., forest.	30 Sept. 1922.	1				3 ♂		
	Valua (J.J.W.). 0–100 ft.	12 Sept. 1900.	1	1	2				
	Vanua Lava (J.J.W.). 0–100 ft.	11 Sept. 1900.	4	2†					
	Vanua Lava (H.W.S.).	25 Nov. 1923. 26 ,, ,,	4		1	1 1		1 ♂	
	Mota (W.W.P.).	5 May 1875.		1					
	Kakea (H.W.S.).	27 Nov. 1923.			3		1 ♂, 3 ♀	7 ♂, 5 ♀	
	Gaua (J.R.B.). N.E. coast: Nombu: dense forest: 0–50 ft.	26 Sept. 1922. 10 Oct. ,, 15 ,, ,, 26 ,, ,, 27 ,, ,, 30 ,, ,, 31 ,, ,,	1 6 1 2	 1 	1 1 3 	 1 1 1 			
	Merelava (Merlav) (J.R.B.). 0–50 ft., forest.	28 Sept. 1922.	1						
NEW HEBRIDES.	Espiritu Santo (J.J.W.). Renée R.: 0–100 ft. On 31 July only—Sarakata R.: sea-level.	28 July 1900. 29 ,, ,, 31 ,, ,, — ,, ,, 2 Aug. ,, 3 ,, ,, — ,, ,,	2 9 1 4 	1† 3 1 3 2 	 1 1 2	1 3 2 2 2			1 ♂ 1 ♂
	Espiritu Santo (J.R.B.). E. coast: 0–50 ft. exc. 8 Jan. (abt. 500 ft.); 9 Jan.—Hog Harb.: clearings. 8 Jan.—Open forest near Hog Harb. 20–21 Jan.—Shark B.: clearings.	8 Jan. 1923. 9 ,, ,, 20 ,, ,, 21 ,, ,,	 3 1	 	2 1 	 			 1 ♂
	Espiritu Santo (H.W.S.).	11 Nov. 1923.	2			1		1 ♂, 1 ♀	
	Espiritu Santo (P.A.R.). 0–600 ft.: E. coast, Hog Harb.—22 July and 8 Aug.; N. coast, Big B.—31 July and 2 Aug.	22 July 1925. 31 ,, ,, 2 Aug. ,, 8 ,, ,,	2 	1 1 1	1 	 1			
	Malo (H.W.S.).	18 Nov. 1923.	4		2		1 ♂, 1 ♀		1 ♀ (19 Nov.)
	Aoba (J.R.B.). N. coast: 0–25 ft.: Tavalovola: clearings and dense forest.	27 Sept. 1922.				3			
	Aoba (H.W.S.).	21 Nov. 1923.	7		2		1 ♂, 2 ♀		

* *Euploea torvina bakeri*, n.s.-sp. It was pointed out in *Tr. Ent. Soc.*, 1924, p. 592, n., that Butler's *paykullei* (1876), being the female of his *torvina* (1875) from the same island, Aneiteum, is a synonym of the latter, and it was also suggested that further specimens of this southern race of *torvina* would prove that it is distinct from that of the more northern New Hebrides and the Banks Is. The material here recorded from Tanna and Aneiteum confirms this opinion. The race of *torvina* north of Erromanga and hitherto named *paykullei* in collections, differs from the southern race in the more distinct and richer brown shade of the dark inner part of the ground-colour, and also of the much paler margin.

♂ Type: in Hope Dept., Univ. Museum, Oxford. From Espiritu Santo, Shark Bay, 20 Jan. 1923; J. R. Baker. Paratypes, from Banks Is. and New Hebrides N. of Erromanga, in British, Oxford, Tring, and Witley Museums.

It is a pleasure to name this race after Mr. Baker, who has done so much to increase our knowledge of the New Hebrides.

Euploea graeffiana with a similar distribution differs in the same manner but more sharply from *E. iphianassa* from the islands to the N. and S. of its range. The following races of *torvina* can now be distinguished: *torvina torvina* from Tanna and Aneiteum; *t. bakeri* from Banks Is. and New Hebrides N. of Erromanga; *t. rileyi* from the Loyalties and New Caledonia. It is probable that all of these will ultimately be recognised as the races of an older species, perhaps *boisduvalii*, Luc.

† Distinct beak-mark on wing of one female.

Islands (generally from N. to S.) and initials of collector.	Date.	*Euploea torvina bakeri*, n.s.-sp.* (*paykullei*, auct.). ♂	*Euploea torvina bakeri*, n.s.-sp.* (*paykullei*, auct.). ♀	*Euploea* (*Salpinx*) *graeffiana*, Herr.-Sch. ♂	*Euploea* (*Salpinx*) *graeffiana*, Herr.-Sch. ♀	*Euploea* (*Stictoploea*) *tristis*, Butl.	*Euploea* (*Saphara*) *jessica*, Butl.	*Euploea helcita lilybaea*, Fruhst.
NEW HEBRIDES.								
Pentecost (C.M.W.).	21–22 Apr. 1886.	6		3				1 ♂
Pentecost (J.R.B.). W. coast. Steep Cliff B., sea-level, forest. N. of Lamalanga, 0–200 ft., clearings and forest—23 Sept.	22 Sept. 1922. 23 Sept. 1922.	1 St. Cliff B.		1	1 Lamalanga. 1			
Pentecost (P.A.B.). N.W. corner: 0–100 ft.	20 June 1925.			1	2			1 ♂
Ambrym (P.A.B.). Sea-level.	22 June 1925.				1			
Malekula or Mallicollo (C.M.W.).	26 Apr.–1 May 1886.	11	3	1	1	2 ♂, 1 ♀	1 ♀	
Malekula (G.F.M.). In Brit Mus.	Probably betw. 1880 and 1885.	1				1 ♂		
Malekula (Leggat). In Tring Zool. Mus.	Unknown date.	2		1	1	2 ♂	1 ♂ 2 ♀	2 ♂
Malekula (J.J.W.). S.W. Bay: sea-level: exc. July—Uré; and exc. June–July—Pangkumu B., coll. by T. Trust.	16 June 1900. 16–17 June 1900. July ,, June-July ,,	1 1 1	1 1		1		1 ♂ 1 ♂, 1 ♀	1 ♀
Malekula (H.W.S.).	16 Nov. 1923. 3 Dec. ,,			1	1			
Epi (J.J.W.). Ringdove B.: sea-level.	20 July 1900. 22 ,, ,, — ,, ,, 8 Sept. ,, — ,, ,,	3 1 1		2 3 2	1 2			1 ♂, 1 ♀
Epi (H.W.S.).	13 Nov 1923 14 ,, ,, 15 ,, ,, 17 ,, ,,	7 3 2		18 5 2 5		2 ♂ 1 ♂		1 ♂ 1 ♂
Epi (P.A.B.) 0–100 ft.	12 June 1925.		1	1	1			
Efate (W.W.P.). Havannah Harb.	30 Apr. 1875.	1						
Efate (A.C.). Havannah Harb.	Presented 1875.			2				
Efate (Layard and ? captor).	Layard in G. and S. Coll.				2			
Efate (J.J.W.). Vila, exc. 17 and 19 July—Palao Bay.	June 1900. 17 July ,, 19 ,, ,, 11 Aug. ,, 5–6 Sept. ,,		1				1 ♀ 2 ♂ 1 ♂	1 ♂ 1 ♀
Efate (J.R.B.). W. coast: 0–25 ft.: Meli: native gardens: exc. 19 Dec. —S.W. coast: 0–200 ft.: Vila: clearings.	13 Dec. 1922. 19 ,, ,,			1	1 1			
Efate (H.W.S.). Vila.	13 Dec. 1923.							1 ♀
Efate (P.A.B.). Vila (2 July) and Undine B. (11 July).	2 July 1925. 11 ,, ,,			1	1		1 ♀	
Totals.		98	25	71	38	14 ♂, 7 ♀	15 ♂, 12 ♀	11 ♂, 5 ♀

* See note on previous page.

captures on a single day in Kakea. Two very interesting forms of this species, a male and a female, taken by Dr. Buxton at the flowers of a tree on the shore of Mai I., between Epi and Efate, on 22 June, 1925, are not included in the table. This form of *jessica*, differing in the great increase of the white markings on both wings, was named *erimas* by Godman and Salvin. Four specimens exist in the British Museum—the ♂ type labelled New Ireland; another ♂—New Britain; and 2 ♀ (Adams Coll.)—New Hebrides. It is possible that *erimas* is a local race in Mai I., a suggestion which it is to be hoped that Mr. J. R. Baker, now in the New Hebrides, may be able to test. Of the other species *lilybaea* appears to be a comparatively uniform race of the variable species *helcita*, while *tristis* varies greatly in the development of the white markings in different parts of the chain and the islands to the north and south of it. An interesting difference between the Euploeine associations north and south of Erromanga is the apparent absence of *tulliolus* or any form representing it from the former islands—an absence referred to by Dr. Buxton on p. 37.

In conclusion, the result of the recent increase in our knowledge is to show that the Euploeine associations of Fiji are represented almost precisely in the fauna of the two southernmost islands of the New Hebrides, while at least two of the four species are represented with little difference in the Torres Is. to the north; whereas in the intervening islands the distinct *bakeri-graeffiana* association has been developed and the important member *tulliolus*, present in the south, is apparently wanting. Nevertheless, in the fauna of Tanna and Aneiteum, the hypothetical origin of the Fijian associations by invasion from the Island Screen of the West has received an unexpectedly complete confirmation.

Diptera stupefied by *Aromia moschata*.—Mr. H. Willoughby Ellis said :—

" On July 31st, and Aug. 1st, 1918, two very hot days, many species of Diptera were very active and flying rapidly in Essex. A large number of both sexes of *Aromia moschata*, L., were present on the old willows, many pairs being *in cop.* Around these paired beetles several species of Diptera had gathered and become torpid and stupefied to such a degree that they could be caught easily with the hand, making no effort to escape. These torpid flies were only to be found around the paired beetles and did not occur near single beetles of either sex.

" The species observed were :—*Phaonia erratica*, Fallen, *Muscina pabulorum*, Fallen, and *Calliphora erythrocephala*, Meigen."

Viviana cinerea, Fallen, parasitic on *Carabus monilis*, F.—Mr. Ellis also said :—

" At Otford, Kent, on Sept. 19th last a fresh specimen of *Carabus monilis*, F., was found amongst some débris, dead, and the thorax parted from the abdomen, for which no apparent reason could be assigned, but otherwise in fine condition. After setting and drying the beetle a specimen of *Viviana cinerea*, Fallen, ♂, emerged from the apex of the abdomen of the beetle on Oct. 1st.

" In Kertesz' catalogue the following hosts of this fly are recorded :—*Carabus cancellatus*; *C. clathratus*; *C. gemmatus*; *C. glabratus*; *C. hortensis*; *C. violaceus*; *Zabrus tenebrioides*; *Procrustes coriaceus*, and *Agelastica alui*. *Carabus monilis* is

therefore a further record, but probably all species of *Carabus* are susceptible to attack."

Variation in *Necrophorus mortuorum*, F.—The two new and very distinct forms of this species, ab. *distinctus*, Ellis, and ab. *disruptus*, Ellis, recently described and figured were also shown. The latter in addition to its very constant and distinct modification of the colour pattern appears always to be a much smaller insect than typical specimens of the species.

The exhibitor also showed a good series of the rare Buprestid, *Agrilus sinuatus*, Ol., from the New Forest, taken by beating old thorns near Brockenhurst during the very hot weather in August 1926.

Wednesday, November 17th, 1926.

Professor E. B. Poulton, F.R.S., President, in the Chair.

Obituary.

The President announced the deaths of Colonel F. Winn Sampson and of Mr. George Grace, Fellows of the Society.

Nomination of Officers and Council for 1927–8.

The Secretary announced that the Council had nominated the following as Officers and Council for 1927–8 :—

President. J. E. Collin, F.Z.S.
Treasurer. W. G. Sheldon, F.Z.S.
Secretaries { S. A. Neave, M.A., D.Sc., F.Z.S.
N. D. Riley, F.Z.S.
Librarian. H. J. Turner.

Other Members of the Council.

R. Adkin, Prof. W. A. F. Balfour-Browne, M.A., F.Z.S., F.R.S.E., P. A. Buxton, E. A. Cockayne, M.A., M.D., F.R.C.P., H. M. Edelsten, J. C. F. Fryer, M.A., Prof. Sir T. Hudson Beare, B.Sc., F.R.S.E., J. W. Munro, D.Sc., Prof. E. B. Poulton, M.A., D.Sc., F.R.S., H. Scott, M.A., Sc.D., W. H. T. Tams, A. E. Tonge.

Election of Fellows.

The following were elected Fellows of the Society :—A. E. Droste, Casilla 1752, Valparaiso, Chile, South America; R. G. Simpson, Verona, Manor Park Crescent, Edgware, Middlesex; W. H. Thorpe, B.A., Zoological Laboratory, Cambridge.

Exhibits.

An abnormal Ornithoptera.—Mr. Arthur Dicksee exhibited an abnormal female of *Ornithoptera victoriae rubianus* and pointed out that the right hind-wing was lighter than usual, the submarginal band of arrowhead-shaped spots showing

clearly as such (though merged together), while in normal specimens they are still further merged into a band, making the submarginal white spots smaller. But on the left hind-wing these arrowhead-shaped spots were still smaller, and, with only one exception, entirely separate, being in size and appearance about the same as in *priamus* female, the anal spot being reduced to only a small dot. Strangely enough in the first space behind the costa there was a black spot on the left wing which was missing altogether on the right wing.

A rare S. American moth.—Mr. W. J. Kaye exhibited on behalf of the Rev. A. M. Moss a bred ♀ of *Copiopteryx jehovah*, Streck. (1874). Mr. Moss found larvae of this species and succeeded in breeding them through. The life-history will be published in due course. In the discussion ensuing Dr. Karl Jordan said that *Copiopteryx* was closely related to *Arsenura* and that the Arsenurinae were a broad-winged branch of the Ceratocampidae.

Lepidoptera from Costa Rica and Rhopalocera from the Mt. Everest expeditions.—The President exhibited on behalf of Mr. C. H. Lankester, and Mr. W. J. Kaye commented upon, an interesting collection of Costa Rican Lepidoptera, including the wonderful Satyrine *Antirrhaea pterocopha*, G. & S.; also a series of butterflies from the Mt. Everest expeditions, in part collected by Mr. G. H. Bullock, in part duplicates received in exchange by the Hope Department from the British Museum (Nat. Hist.). The collection, which illustrated Capt. N. D. Riley's paper in *Trans. Ent. Soc.*, 1922 (1923), pp. 461–83, was briefly described by the author.

The action of light upon insect pigments.—The President exhibited a glazed store-box containing miscellaneous insects, formerly the property of the Entomological Society, which had been presented in 1857 to the Science Museum, S. Kensington, and was now returned to the Society. It was evident that the insects had been exposed to light for a period of nearly 70 years, and perhaps longer. The Council had offered the case and contents to the Hope Department, where the specimens could be compared with those which had been exposed in the East India Company's show-cases. It was hoped that at the next meeting, on 1 December, a glazed wall-case belonging to the late Rev. F. D. Morice would be exhibited and the effect of light compared with that seen on some of the insects before the meeting.

Wednesday, December 1st, 1926.

Professor E. B. Poulton, F.R.S., President, in the Chair.

Nominations of Officers and Council.

The Secretary read for the second time the nominations for Officers and Council for 1927–8.

Election of Fellows.

The following were elected Fellows of the Society :—Miss M. Samman, Willerby Manor, near Hull; Mr. V. B. Wigglesworth, Dirleton House, Battlefield Road, St. Albans.

W. J. Lucas, del. *Vaus & Crampton, Ltd.*

GRYLLOBLATTA CAMPODEIFORMIS, WALKER, ♀
(Colour, golden russet).

Exhibits.

The Biology and Affinities of *Grylloblatta*.—Dr. A. D. Imms exhibited a female example of *Grylloblatta campodeiformis*, Walk., a generalised Orthopterous insect taken by Miss Norma Ford at Lake Louise, Alberta, on Sept. 13th, 1925. The genus and species was discovered by Dr. E. M. Walker in 1913, and the first examples were found on a talus slope of a mountain at an elevation of about 6,500 ft. at Banff, Alberta, in 1913. In 1925 seventy examples were taken by Miss Ford in the Canadian Rockies, and the insect has also been met with in California. It lives normally at about zero Centigrade. Early attempts to keep the insect alive failed, but this difficulty has now been overcome by Miss Ford (vide *Canadian Entom.*, March 1926), who kept examples in jars continually surrounded by ice and placed them in partial darkness. Miss Ford states that they are omnivorous as regards feeding habit, and were fed upon larvae and pupae of ants. Later houseflies were given, and in winter they were fed upon cockroaches. In addition to animal food Miss Ford found that they nibble bark and moss. *Grylloblatta* rarely attacks living insects, and when supplied with them, waits until they are numbed by the cold before commencing to prey upon them. Mr. A. N. Caudell has suggested that, in nature, their food consists of the insects that during sunshine fly, or get blown, to the colder parts of the mountains only to be rendered inactive or killed by the low temperature at night. Mating has been accomplished in captivity, and the insect was found to lay its eggs separately, not in an ootheca; they are black in colour and were deposited in soil moss.

The apterous condition of *Grylloblatta* is almost certainly a secondary feature associated with a mode of life beneath stones, etc., on mountain sides where low temperatures prevail. It is also noteworthy that apterous species occur in all families of Orthoptera, and in these cases they have unquestionably descended from originally winged ancestors.

From the phylogenetic point of view *Grylloblatta* is of exceptional interest in that it is a synthetic type combining characters of the Isoptera, Orthoptera (*sensu lat.*), Embioptera and Dermaptera. The affinities of the family Grylloblattidae have for this reason given rise to considerable discussion. In so far as the main characters go Dr. Walker and the exhibitor regard the balance in favour of their belonging to the Cursoria. The 5-jointed tarsi, nearly equally developed legs, the absence of stridulatory organs, the 8-jointed cerci and the asymmetrical male genitalia are all features belonging to the Cursoria group. The general arrangement of the musculature, as Miss Ford has recently shown, also supports that same conclusion. On the other hand, the long exserted ovipositor and various details in the external structure of the head and trunk reveal characters which incline Dr. Crampton to consider *Grylloblatta* as more closely related to the Gryllidae and Tettigoniidae. At present we know nothing concerning the internal anatomy, but it is probable that the alimentary canal and reproductive organs will yield significant evidence either towards one view or the other.

In connection with this exhibit Mr. W. J. Lucas showed a drawing, in colour, of this remarkable insect.

A Leaf-mining Tipulid Larva from the Hawaiian Islands.—Dr. A. D. Imms also exhibited leaves of *Cyrtandra* (fam. Gesneriaceae) from the island of

Oahu. These specimens showed the serpentine mines made by larvae of the Tipulid, *Dicranomyia foliocuniculator*, Swezey. He mentioned that the specimens were obtained when he visited the islands in May 1925, and commented upon the exceptional nature of the habit among Tipulidae.

A living family of *Anisolabis maritima*.—Mr. Hugh Main exhibited a family of the earwig *Anisolabis maritima* bred from ova deposited in captivity by a female taken in Algeria in May 1926. They had been reared in a plaster-of-paris formicarium containing a layer of damp sand, part of which was covered by a small piece of glass. He said that it is well known that the female of *Forficula auricularia* broods over her eggs and in cases of necessity transports them from one place to another. The *Anisolabis* did not brood over her ova, but occasionally carried them from one part of the formicarium to another. What appears to be a new observation was that after the eggs had hatched she carried the young nymphs between her mandibles into the burrow which she had made below the glass plate lying on the sand. She always did this when the cage was brought from the dark into the light. Freshly killed bluebottles or houseflies, and puparia of various Diptera were supplied as food. The mother died at the end of November, when the young after three or four moults were apparently about half grown. There were 17 in one family and 31 in another.

Hybrids of *Thera* spp.—Dr. E. A. Cockayne exhibited and made remarks upon *Thera obeliscata*, Hb., including banded forms, *Thera variata* Schiff., and ab. *nigrosignata*, Prout, all from the New Forest, as well as the following hybrids :—*T. obeliscata* ♂ × *T. variata* ♀—17 ♂, 6 ♀; *T. variata* ♂ × *T. obeliscata* ♀—19 ♂, 8 ♀.

Biological Notes on *Arsinoë grandis*, Péring. (Coleopt. fam. Carabidae) and other parasites of *Catamerus revoili*, Fairm.—Mr. K. G. Blair in exhibiting these beetles with their larvae said that some months ago Professor Poulton received from Dr. W. A. Lamborn from Nyasaland some larvae of the Tenebrionid beetle *Catamerus revoili*, Fairm., to which were attached other small Coleopterous larvae. Upon examination these proved to belong to the family Carabidae. From these larvae Dr. Lamborn was successful in rearing the beetle, and has supplied the following details of their occurrence and development.

During the early wet season, in the uplands of Nyasaland, companies of the shining blue-black larvae of a Heteromerous beetle, *Catamerus revoili*, Fairmaire, often numbering some hundreds, are commonly to be seen on rocks, especially in moist situations favouring the growth of certain lichens. The larvae which feed on these lichens are very slow-moving and highly conspicuous, but although I had often observed them between 1914 and 1924, particularly at Zomba, and had speculated as to the possible controlling agencies, I always failed to witness any attack by predaceous enemies, and only rarely found any fragments of dead larvae. However, in March 1925, when examining a large company in a new locality, viz. Maiwale (3,200 feet), twelve miles east of Fort Johnston, I observed at once that a few of the *Catamerus* bore one, and occasionally two, of the parasitic larvae of another beetle, holding on by the mandibles. A good series was obtained for laboratory study, the parasites being at the time about the same age and quite small, while the *Catamerus* larvae also belonged to broods of uniform size. Later

in the season, however, companies with mixed broods of different ages and sizes were seen.

The parasite usually attaches itself to the side of the dorsal surface of an abdominal segment, although on rare occasions it seizes its victim by the underside, or grips it by a leg or an antenna. The legs are infolded and not employed to render the attachment more secure. The grip of the mandibles is in fact so powerful that it is not uncommon to see one of the larvae hanging head downwards, while any attempt to detach it with forceps produces a deformation of the body of the host. The predaceous larva at first feeds by suction and does not attack the solid tissues. The host, while gradually losing its body fluids, continues to feed until it becomes too enfeebled even to move. On the death of its victim the parasite relinquishes its hold, and, running about very actively turning its head first to one side and then to another, soon finds another larva which it seizes and immediately becomes fixed to the point where it first made contact. As the parasite grows larger it ceases to be entirely suctorial and devours the solid tissues, gradually forming a cavity in the body of its host, into which it may entirely disappear. The victim sometimes remains alive until it is a mere shell. If attacked by a small larva it may endure for one or two weeks; if by a larger one, then only for a day or two. It was not possible to ascertain how many may be killed by one parasite owing to the difficulty of getting sufficient food down in the plains to which the insects had been transferred from the hills. Ecdysis of the parasite may take place while remaining *in situ*, or it may drop off, leaving its cast skin still attached.

The duration of the larval state of the parasite must be long; for some of those obtained on 30th March buried themselves on or about 1st July. The subsequent stages endure in some instances for fully two months. Thus the larvae which buried about 1st July did not produce imagines until September, three emerging on 2nd, 9th and 15th, respectively. The imagines turned out to be Carabidae [*Arsinoë grandis*, Péring.], beetles that occasionally come to lamplight during the Dry Season or can be found beneath bark on large trees.

Towards the end of the Wet Season when lichens begin to wither, the larvae of the Heteromerous host become fewer and fewer; for they also pupate underground. The imagines are in evidence throughout the Dry Season, feeding, when they have the chance, on the same lichens as the larvae, but more often than not they are to be found in large numbers under loose bark, or in holes in rock.

An attempt was made to answer the question as to whether the parasitic larvae attack the imagines as well as the larvae of *Catamerus*. The parasitic larvae were never seen on the beetles themselves, nor did they attempt to attach themselves when introduced beneath the elytra. In order to decide this point the upper surface of the abdomen was examined in a large number of *Catamerus*, resulting in the discovery of another enemy; for the empty puparium of a Dipteron was occasionally found concealed beneath the elytra. In one instance there were two puparia on a single beetle. The inquiry was resumed in October, during the late Dry Season of the present year, when no fewer than 755 beetles were collected for examination. The presence of a small white projection had already been often noticed on the elytra of some of these beetles, but it had been hastily assumed that the mark had been caused by one insect fouling another with its excreta. The discovery of the presence of Dipterous puparia induced me to make a more

critical examination, and it was then found that the white mark was an ovoid and flattened egg. By removing an elytron on which one of these had been placed and examining the underside with the microscope, it was easy to detect beneath the egg a tiny aperture surrounded by a darkened area, presumably a zone of inflammatory infiltration. The parasite must have reached the body of its host through this aperture, a conclusion supported by the results of dissection; for a Dipterous larva was found, disposed lengthwise and to one side of the middle line of the beetle. Out of the 755 beetles collected 23 bore each a single egg and one beetle—two. In several instances Dipterous puparia appeared under the elytra subsequent to capture, and these in due course yielded Tachinid flies. Although a few of the hosts died before the imago of the Dipterous parasite had emerged, several survived for many days, but, owing to the difficulty in maintaining the food-supply, it was impossible to ascertain whether they would have continued to live. The eggs had been placed on various parts of the underside of the abdomen of fifteen beetles, on the elytra of eight, and on the dorsum of the thorax of one.

These Tachinid parasites are in turn checked by Chalcids, a puparium of the former found on a beetle, taken 9th October, affording twenty-two of the hyper-parasites six days later.

The inquiry was extended to another species of *Catamerus* (857), and one out of the nine specimens investigated bore an egg similar to those found on *C. revoili*.

[An examination of the series of *Catamerus* in the British Museum revealed the presence of these Tachinid eggs there also, one specimen of *C. rugosus* having three eggs, one on the elytra and two close together on the side of the thorax. On the allied *Pycnocerus sulcatus*, F., similar though smaller eggs, presumably of another species of Tachinid were found.—K. G. B.]

Mr. Blair then gave the following description of the larva of *Arsinoë grandis*.

Upper surface black, well chitinised, with broad complete dorsal sclerites completely covering the body, the ventral sclerites broken up into numerous small plates on a soft whitish membrane. Head transverse, subglobose behind, as wide as pronotum, its greatest width well behind the ocelli; clypeus widely, angularly emarginate and denticulate in front, mandibles short, curved, sharply pointed, scarcely overlapping when closed; maxillae short, scarcely projecting; antennae stout and straight, the third joint as long as the two first together and fully as wide as them, the last joint but little longer than the second and scarcely half as wide. Dorsal sclerites widened from front to rear, with a blunt postero-lateral angle projecting laterally, completely covering the softer ventral parts, the 9th abdominal segment with a pair of stout, tapering, unjointed, dorsal processes directed backwards, a little longer than the terminal proleg and irregularly set with a few short spines. The ventral abdominal plates arranged as follows :—(4th abdominal segment) a broad transverse median plate on the anterior half of the segment, close behind it a pair of quadrangular plates together not as wide as the anterior single plate; lateral to these on each side three oval plates longitudinally placed increasing in convexity, the outermost being strongly gibbous and bearing several short bristles; between this outermost plate and the dorsal sclerite, and near the anterior margin of the segment is a minute black plate containing the spiracle.

(N.B. This description is taken from the small, probably second instar larvae first received, but Dr. Lamborn's account does not indicate that it alters much apart from size in the later stages.)

In general appearance the larva resembles that of *Chlaenius* (*C. vestitus*, Payk.,

Schiodte, *Metam. Eleuth. Obs.*, III, 1867, p. 242, Pl. XX, figs. 3-9; also Reitter, *Faun. Germ.*, Col. I, 1908, Pl. 28, fig. 1*a*), but has a very differently shaped head, with much shorter, stouter appendages, the antennal joints differently proportioned, the dorsal sclerites wider and projecting laterally and the dorsal processes of the 9th abdominal segment shorter, subconical and more sharply pointed.

The genus *Arsinoë* is placed in the subfamily Lebiinae, but the larva is at first sight completely unlike that of *Lebia scapularis*, Fourcr. (Silvestri, *Redia*, II, 1904, pp. 68–84, Pls. III–VII). It agrees, however, with the first larva of this species (*loc. cit.* fig. 1) in the well-developed posterior part of the head, and in the two short basal joints of the antennae, but differs in its generally stouter build, in the much shorter and more compact appendages, in the dorsal plates being undivided and completely covering the body and in the stout unjointed processes of the 9th abdominal segment. There is in *Arsinoë* apparently no trace of the second larval form (hypermetamorphosis) found in the *Lebia*, but whether this is a peculiarity of the genus *Lebia* or even of the species, *L. scapularis*, or whether it occurs more widely in the subfamily, I am unable to say.

Dr. Imms referred to Prof. Silvestri's paper (*Redia*, II) on *Lebia scapularis*, which attacks the immature stages of the Chrysomelid *Galerucella luteola*, and is further interesting in that it undergoes hypermetamorphosis.

The terrifying appearance of the pupa of *Dysphania* (*Euschema*) *palmyra*, Cram. (Geometridae), observed by Mr. G. M. Henry, in Ceylon.—The President exhibited the pupa of a Geometrid moth from Ceylon, given to him by Mr. G. M. Henry, Curator of Entomology in the Colombo Museum. Mr. Henry had observed the remarkable terrifying appearance of the anterior end of the pupa which was, in the natural state, enclosed between leaves loosely spun together and thus visible to a searching enemy in the same manner as the Hesperid pupa from Pará recently described and exhibited to the Society by the Rev. A. Miles Moss (*Proceedings*, 1926, p. 34). The terrifying appearance of the *Dysphania* was due to the presence of two relatively large, round, dorsally yellow-encircled, intensely black, eye-like marks on the anterior end of the pupa, and between them an apparent narrow snout, suggested by the arrangement of the pale markings. The eye-like appearance was produced by a reniform black mark enclosing in its concavity the aperture leading to the prothoracic spiracle—an appearance greatly enhanced by the colour of the surrounding pupal surface which gave the effect of a broad yellow rim encircling the upper part of the dark "eyes."

The position of the "eyes," with their apparent forwardly directed look, was not that of a snake or lizard, and it was suggested that by association with past experience they probably called forth something of the terror inspired by the little bird-eating Slender Loris (*Stenops gracilis*) of Ceylon and S. India—a small lemur said to be only ten inches long. An excellent print of a Slender Loris in the Zoological Gardens from the *Times* of 19th November, 1926, was exhibited side by side with the pupa. It would be of much interest to examine the pupae of other species of the genus from localities where these or similar enemies of birds are unknown.

It was necessary to guard against the inference that belief in the advantage of a resemblance to the most characteristic features of a deadly enemy involved the hypothesis that the appearance is actually mistaken for the enemy—that, in the

present instance, a bird would think: "There is a Slender Loris, although a very small one!"; or, in the example represented on Plate A, *Proc. Ent. Soc. Lond.*, 1924, that a monkey would believe that it was in the presence of a minute alligator up in a tree. The reasonable conclusion was that such insects were defended by an appearance which, in the brain of their enemies, was associated with a terrible danger, these enemies depending for very existence on their instant alarm at the possibilities which might lie behind an unfamiliar form and still more a form known by experience to be deadly. This principle would explain the gradual growth of a resemblance from an incomplete to a more perfect stage with a stronger suggestion of danger.

Birds' beak-marks on the wings of New Hebridean Euploeas and *Pieris napi*, L., from the Isle of Wight.—The President exhibited two female *Euploea torvina bakeri* captured by Commander J. J. Walker 28 July, 1900, in Espiritu Santo, N.H., and 11 September, 1900, in Vanua Lava, Banks Is., respectively; the former with a rather broad beak-mark, the latter with a narrow beak-mark, both on the right fore-wing. The specimens were recorded in *Proc. Ent. Soc. Lond.*, 1926, p. 52. With these were exhibited a male *E. iphianassa*, Butl., f. *iphianassa*, captured by Dr. P. A. Buxton, 22 September, 1925, and a male *E. tulliolus*, F., 23 September, 1925, on Tanna I. (N.H.), bearing respectively a very broad and a narrow beak-mark on the left fore-wing (*ibid.*, p. 49). Also a male *Pieris napi*, L., taken by the exhibitor 26 August, 1926, on the Common, St. Helens, Isle of Wight. The specimen bore distinct beak-marks on both the left wings and the right hind-wing. Photographs of the five specimens were also projected on the screen.

A strangely torn butterfly's wing.—The President exhibited a male of the Indian butterfly *Euthalia lepidia*, Butl. (*cocytus*, Moore), sent to him by Mr. W. M. Crawford, B.A., who had directed his attention to the peculiar manner in which the left wings were torn, leaving a pronounced serrated edge with the teeth drawn out into fine points, invariably corresponding with the centres of the intervenular spaces, while the apices of the inwardly directed V's between the teeth corresponded with the veins. A sharp, straight line crossing the wings and touching each apex had apparently been caused by the bite of some enemy, but however caused, it was obviously the line along which each vein had been broken through. The question arises—Why should not the wing-membrane have broken along the same straight line, or why with these serrations instead of serrations with a vein at each projecting point and the apex of each inwardly directed V mid-way between each pair of veins? The problem was physical and mathematical rather than biological, and it was hoped that Dr. R. J. Tillyard would have studied it, but his time in this country was so fully occupied that he had not been able to complete the investigation. In the mean time it was suggested that this curious result was due to the wing-membrane being strongest mid-way between the veins, a conclusion perhaps supported by the fact that the points of the serrations (corresponding to the mid-position) were generally drawn out into a fine thread. Whatever be the explanation the fracture is a characteristic one and might often be observed, although not in the extremely perfect form shown on the specimen exhibited to the meeting.

The prolonged action of light on the pigments of butterflies and moths.—The President exhibited specimens from the Dale Collection and the East Indian Company's Collection, for comparison with those in a glazed box formerly in the possession of the Entomological Society (*Proceedings*, 1926, p. 56), and in a framed wall-case which hung in the study of the late Rev. F. D. Morice. A female *P. machaon*, L., bearing the label " Newland Common, Glanville's Wootton Dorset, Aug. 17, 1815, J. C. Dale," proved that the pigments of this species might, in favourable conditions, remain entirely fresh and unchanged for 111 years. An example of the N.W. Himalayan race of the same species from the E. Indian Company's Collection showed that the yellow pigment had, after long exposure to light, faded to a paler tint. The yellow pigment of two *P. demoleus*, L. (*erithonius*), in the wall-case had become a dull yellowish-brown similar to that of three *P. machaon* in the Dale Coll., one of which was exhibited. It had been suggested (*ibid.*, 1924, p. cii) that this change was produced by chemical treatment. Further examination, however, indicated that it had been brought about by light in combination with some other condition such as an unusual degree of damp. That light had played an essential part was shown in the *machaon* by the very slight darkening of the under surface and the persistence of the pale tint on the part of the hind-wing upper surface overlapped by the fore-wing. It was remarkable that a similar peculiar effect had been wrought in the fluorescent pigment of *demoleus* which darkened in light, and the non-fluorescent pigment of *machaon* which normally became paler in light. An example of *demoleus* from the E. Indian Collection showed the usual darkening of the pale pigment, resulting in a brown tint very different from the darker, duller colour of the two specimens in the wall-case. On the other hand a male *P. polytes*, L., in the wall-case had reacted to light in the same manner as the males in the E. Indian Collection (*ibid.*, p. ci), one of which was exhibited to the meeting.

The two exhibited Dale *machaon* were referred to in Commander J. J. Walker's paper in *E.M.M.*, 2nd ser., vol. xviii, 1907, p. 95, and the E. Indian Company's specimens in *Proc. Ent. Soc. Lond.*, 1924, pp. xcix and cxiv.

A Limacodid injurious to coconuts in Trinidad.—Dr. C. L. Withycombe exhibited examples of the Limacodids *Natada urichia*, Schaus, and *Phobetron coras*, Cram., and showed lantern slides demonstrating the damage done by the former in a coconut plantation in Trinidad. He also gave some particulars of the early stages of this moth and of the circumstances of the outbreak.

ANNUAL MEETING.

Wednesday, January 19th, 1927.

Professor E. B. Poulton, D.Sc., F.R.S., etc., President, in the Chair.

Mr. N. D. Riley, one of the Secretaries, read the following

Report of the Council.

The Council reports that the various activities of the Society have been maintained during the year.

The financial position will be dealt with separately in the Report of the Treasurer.

Since the last Annual Meeting the following 12 Fellows have died or their deaths have been ascertained :—

W. Bateson, A. E. J. Carter, C. Fenn, G. Grace, J. L. Hancock, O. E. Janson, G. Lewis, F. D. Morice, J. C. Moulton, E. Piazza, F. Winn Sampson, and C. L. Withycombe.

The following 10 Fellows have resigned :—

W. Bowater, G. C. Buckley, Miss F. B. Constable, R. S. Hole, W. H. Jackson, Miss G. Jeans, H. S. Pruthi, T. V. A. Ramakrishna, G. B. Ryle, and O. H. Walters.

The following have been removed from the List of Fellows in accordance with the Bye-Laws, Chap. XV, Sec. 3 :—

E. H. Blackmore, G. A. Bodkin, J. A. de Gaye, H. M. Giles, W. G. Harding, S. C. Harland, A. Leechman, B. Raymundo, J. G. Rhynehart, and R. Vitalis de Salvaza.

During the year 29 Ordinary Fellows, 2 Special Life Fellows, and one Honorary Fellow have been elected. These represent, however, only 30 actual additions to the list to set off against a loss from all causes of 32. Consequently there is a slight fall in the total numbers—the first for several years—from 716 to 714. The Society now consists of 12 Honorary, 4 Special Life and 698 Ordinary Fellows.

The year 1926 will always be an important one in the history of the Society's Publications, owing to the change in their form which was foreshadowed in last year's Report. The Council hopes that this change will meet with general approval and that the Publications in their new form will be considered worthy of the dignity of the Society. For the first time the *Transactions* and *Proceedings* appear as two distinct Publications. The volume of the *Transactions*, which now appears in two Parts only, consists of 466 pages, comprising 23 papers by the following authors :—

Dr. A. G. Böving, 1; Dr. M. Cameron, 1; W. E. China, 1; L. D. Cleare, Jun., 1; Dr. E. A. Cockayne, 2; F. W. Edwards, 1; Dr. H. Eltringham, 3; Col. F. C. Fraser, 1; A. H. Hamm and O. W. Richards, 1; A. M. Lea, 1; E. Meyrick, 1; F. Muir, 1; Dr. J. G. Myers and G. Salt, 1; A. Philpott, 1; O. W. Richards, 1; N. D. Riley, 1; Drs. V. G. L. and R. A. L. van Someren, 1; B. C. S. Warren, 1; C. B. Williams, 1; G. Fox Wilson, 1.

Of these 8 deal with Lepidoptera, 4 with Coleoptera, 2 each with Hymenoptera, Diptera and Rhynchota, 1 each with Neuroptera and Odonata, and 3 are of a general character. The volume is illustrated by 93 plates of which 3 are in colour, 82 are half-tone and 8 are line-block. There are also numerous text-figures. The

original illustrations have in all cases been provided by the authors. The Society received a very substantial contribution from the Royal Society towards the cost of Mr. B. C. S. Warren's paper. Dr. E. A. Cockayne paid for the cost of the plates to illustrate his paper, and Prof. E. B. Poulton authorised a payment from the Oxford University fund for the Promotion of Organic and Social Evolution to defray the expenses of the paper by Messrs. Hamm and Richards.

The *Proceedings* will consist of 63 pages and be illustrated by 3 plates.

The detailed work of the Society's business has been carried on by a Finance and Housing Committee under the chairmanship of Mr. G. T. Bethune-Baker, a Publications Committee under that of Mr. J. E. Collin, and a Library Committee under that of Dr. K. Jordan. The thanks of the Council are again due to the Fellows serving on these Committees for their valuable assistance.

The Meetings of the Society have been very well attended, the average number present at each having been 66, which by a coincidence is the same as in the previous year.

The Hon. Librarian reports that the use of the Library is increasing and that there is a steady growth in the number of volumes taken out or sent out on loan. The Librarian also has frequent queries and references on bibliographical matters to deal with. The Society is gradually acquiring a very large stock of Separates to which various Fellows have kindly contributed, including considerably over a thousand items on Coleoptera from Mr. H. E. Andrews, by far the greater number of which were not represented in the Society's collection. During the year considerable advance has been made in rearranging these Separates so as to render them more easy of access with the use of the card index. Gifts of Separates are very welcome as often it is possible to exchange duplicates for desiderata. The best thanks of the Society are due to those who have thus assisted it.

The Honorary Secretary of the Committee for the Protection of British Lepidoptera reports that although a certain amount of progress had been made by the Committee since it was appointed by the Society in June 1925, it was not possible to report any definite results at the end of that year.

Negotiations as to the formation of a reserve for *Lycaena arion* in N. Cornwall were opened with certain naturalists in that district. A member of the Committee also went there to further this object, but the negotiations for a piece of land on which it was hoped to form a sanctuary for this butterfly have not yet been successful. An appeal to Entomologists to give it a rest for a few years was published in all the Entomological Journals and circulated to Societies throughout the country, and, for the present, the Committee must rely upon the success of this appeal.

Two landowners in Surrey are trying to establish colonies of *Melitaea athalia* on their property, but we shall not know with what result until next spring.

A number of full-fed larvae of *Melitaea cinxia* were turned out at a locality in Sussex, and some imagines were seen at a later date, but the weather became very rough and it is not known if any eggs were deposited. Further batches of ova were obtained, and the resulting young larvae have been put out in a suitable spot on private land on the South Coast.

By the sympathetic action of a landowner in the Norfolk Broads district who has placed part of his marshes at our disposal, we were able to make an experiment

in introducing *Chrysophanus dispar rutilus* (North German race). Capt. E. B. Purefoy and Mr. H. M. Edelsten selected a suitable spot for the experiment. The former provided a large number of pupae from his colony of this butterfly in Ireland; these were sent to the keeper, who placed them in muslin-covered cages out in the marshes and visited them twice daily during the hatching period and released the perfect insects. The weather during the first period of emergence was very favourable, and numerous pairings were reported, but subsequently it became very rough, and owing to the lateness of the wild flowers on which the butterflies depended for food it is feared that the experiment has not been quite so successful as was hoped. Capt. Purefoy visited the marshes twice this autumn, but was rather disappointed with the number of larvae observed. Part of the marsh had been inadvertently mown, and no doubt many of the larvae had thus been destroyed.

Through the generosity of Lord Rothschild an experiment is also being made at Wood Walton Fen with *Chrysophanus dispar batavus* (Dutch race). An area is being prepared and additional Water Dock (*Rumex hydrolapathum*) and extra wild flowers are being planted. Capt. Purefoy is hibernating some larvae obtained from Holland, and it is hoped to procure some more next spring so that we may have sufficient material to work with.

The Report was adopted on the motion of Mr. H. E. Andrews seconded by Professor Balfour-Browne.

The Treasurer's Report.

A year ago I made a suggestion in my Report that the Society should commence seriously to take in hand the provision of the funds that would be required for the erection of its new Meeting Room and for transferring the Library from its present quarters to the room we now use for our meetings.

At that date, the amount standing to the credit of the New Meeting Room Fund was £419 0*s*. 0*d*. During the past year, this fund has been increased by £1,197 0*s*. 3*d*., making the present total £1,616 0*s*. 3*d*.

Early in 1926 I made as careful an estimate as possible of the sums the Society would require to set aside each year so that the estimated amount required for the alterations, *i.e.* £4,500, would be available in 1929, the date when I anticipated the work could be carried out with the greatest advantage to the Society. So far the amount accumulated is equal to my estimate.

The receipts and expenditure during the past year have varied but little from those of 1925, with the following exceptions.

The only serious variation in the receipts is the large drop in the amount of Sales of the Publications, £342 13*s*. 4*d*. in 1926, as against £639 7*s*. 1*d*. in 1925, a decrease of £296 13*s*. 9*d*. This is due to a certain extent to the relatively late issue of the parts of the *Transactions* for 1926.

The amount spent on the Publications is much less, £521 8*s*. 2*d*. in 1926, as against £934 1*s*. 6*d*. in 1925. This is largely accounted for by the late appearance of Part I, 1926, making it impossible to get the whole of the liabilities incurred for this part paid by the end of the financial year. The fact that Parts III, IV, and V, 1925, published in 1926, are much smaller than the corresponding ones for the previous year has also reduced the expenditure under this heading.

I am glad to report an increase in the amount spent on New Books, £145 8*s*. 10*d*. in 1926, as against £127 4*s*. 8*d*. in 1925.

There has also been a great drop in the cost of Repairs to Premises, the amount spent being, in 1926, £28 12*s*. 0*d*., in 1925, £173 18*s*. 1*d*.

Donations in aid of the Publications include £150 from the Royal Society towards the cost of Mr. Warren's monograph, which comprised Part I of the *Transactions*, and £12 4*s*. 3*d*. from Dr. E. A. Cockayne, being the cost of the plates illustrating one of his papers in Part II.

The thanks of the Society are due to these Donors for their generous and much-appreciated gifts.

A contribution of £25 was made towards the cost of the Zoological Record.

After allowing for all current obligations that can be traced, the excess of income over expenditure is £205 18*s*. 11*d*.

I am glad to be able to report that during the past year there has been a large increase in the number of Fellows who pay their subscriptions through their Bankers to the Society's Bankers. The number that adopted this method last year was 310. Its advantages are so obvious, both to the Fellows and the Society, that I trust there will be a further large number who will adopt it during the current year. The advantages include avoidance of risk of loss in the post, of charges for Money and Postal Orders, stamps on cheques and receipts, and postage, and also of all correspondence on the subject of subscriptions.

For many years by reason of its constitution and objects, the Society, in common with all similar societies, has been free from the liability for the payment of Income Tax; during the past year, however, Income Tax has been deducted from certain of the Society's securities and has not yet been recovered.

The defence of the rights of the whole of the Societies involved has been taken up by the British Association, and the action of the Income Tax authorities is being tested in the Courts.

It is understandable in the serious state of the Nation's Finances that the authorities are anxious to take every legitimate step to collect the tax, but in the present state of the law, it is difficult to see how our Society can be made liable. In any case the amount involved is relatively so small, and the Societies are doing such important national work, that the loss to the country is likely to be far greater than the sum gained by imposition of the tax.

The Report and Accounts were adopted on the motion of Commander J. J. Walker, seconded by Dr. J. W. Munro.

The President, Professor E. B. Poulton, F.R.S., then read his Address, and at its conclusion a vote of thanks to him, coupled with the request that it might be printed in the *Proceedings* was moved by Mr. J. E. Collin, seconded by Mr. G. T. Bethune-Baker, and carried unanimously.

A discussion took place on the Address in which Professor E. W. MacBride, F.R.S., Dr. P. Chalmers Mitchell, F.R.S. (visitors), Dr. K. Jordan, Dr. E. A. Cockayne, Dr. J. Waterston and Professor Balfour-Browne took part.

A vote of thanks to the Officers for their services during the year was then passed on the motion of Mr. H. Willoughby Ellis, seconded by Mr. K. G. Blair, and Mr. W. G. Sheldon, Mr. N. D. Riley, and Mr. H. J. Turner briefly replied.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

TREASURER'S ACCOUNTS for the Year ended December 31, 1926.

(Presented at the Annual Meeting, January 19, 1927.)

RECEIPTS AND PAYMENTS ACCOUNT.

Receipts.	£	s.	d.	£	s.	d.
To Cash at Bank and in hand, as per last Account—						
General Account	1,027	11	6			
Westwood Bequest Fund	7	3	8			
Compounding Fund	46	15	5			
Library Fund	18	16	7			
Donations for Specific Purposes	75	0	0			
				1,175	7	2
„ Interest on Investments—						
Birmingham 3% Stock	7	3	8			
Consols	30	9	4			
National War Bonds, 1928	31	10	5			
„ Interest—						
Hamilton Druce Bequest	39	8	11			
„ Interest on Deposit—						
General Account	24	10	0			
„ Rents from Sub-tenants	425	0	0			
				558	2	4
„ Contributions by Tenants towards House Expenses				151	13	3
„ Admission Fees				97	13	0
„ Annual Subscriptions—						
Arrears	65	6	0			
1926	1,229	9	3			
Advance	35	1	3			
				1,329	16	6
(Subscriptions for 1926 received in 1925, £25 3*s.* 11*d.*)						
„ Sales of Publications				342	13	4
„ Donations in Aid of Publications				106	19	0
				£3,762	4	7

Payments.	£	s.	d.	£	s.	d.
By Salaries				358	4	6
„ Library—						
New Books	145	8	10			
Binding Repairs and Insurance	36	9	0			
				181	17	10
„ Cost of Publications—						
Printing and Distribution	510	9	8			
Illustrations	10	18	6			
				521	8	2
„ Sundry Printing and Stationery				39	16	4
„ Postage				33	12	8
„ Audit Fee				10	10	0
„ Donation to Zoological Record				25	0	0
„ Miscellaneous Expenses				29	9	3
„ House Expenses—						
Fuel, Gas, and Electric Light	74	13	8			
Insurance	10	9	10			
Water	12	6	3			
Repairs	28	12	0			
Sundry Expenses	60	19	2			
				187	0	11
„ Transfer to New Meeting Room Fund				1,167	19	8
„ Purchase of 5% National War Bonds, 1928				50	5	0
„ Cash at Bank and in Hand—						
General Account	1,050	6	2			
Westwood Bequest Fund	14	7	4			
Compounding Fund	45	6	11			
Library Fund	5	11	10			
Repairs to Premises Fund	41	8	0			
				1,157	0	3
				£3,762	4	7

STATEMENT OF ASSETS AND LIABILITIES—DECEMBER 31, 1926.

Assets.

	£ s. d.	£ s. d.
To Freehold Premises, 41 Queen's Gate, S.W., Cost of Purchase		6,250 0 0
„ Library, Furniture and Fittings	Not valued.*	
„ Present Value of—		
£1354 2*s.* 2*d.* 2½% Consols (Compounding Fund—Cost £1233 3*s.*)	731 4 4	
£657 3*s.* 5% National War Bonds, 1928 (Compounding Fund—Cost £665 0*s.* 1*d.*)	693 3 9	
£239 12*s.* 4*d.* Birmingham Corporation 3% Stock, 1947 (Westwood Bequest—Cost £250)	148 11 3	
£1095 15*s.* 6*d.* New Zealand 4% Stock, 1943–63 (Hamilton Druce Bequest Fund—Cost £1000)	931 8 1	
£1499 4*s.* 2*d.* 5% National War Bonds, 1929 (New Meeting Room Fund—Cost £1576 6*s.* 1*d.*)	1,574 3 4	
		4,078 10 9
„ Amounts due to the Society—		
Subscriptions	92 14 0	
Admission Fees	6 6 0	
Publications	83 11 7	
Rents and Contributions to House Expenses	132 10 0	
Sundries	12 6 7	
	327 8 2	
Less—		
Not considered good	25 0 0	
		302 8 2
„ To Cash at Bank and in Hand—		
General Account :		
Current Account (226 8 3)		
Deposit Account (817 0 0)		
Cash in Hand (6 17 11)		
	1,050 6 2	
Compounding Fund—Current Account	45 6 11	
Library Fund—Current Account	5 11 10	
Westwood Bequest Fund—Current Account	14 7 4	
New Meeting Room Fund—Current Account	41 16 11	
Repairs to Premises Fund	41 8 0	
		1,198 17 2
		£11,829 16 1

Liabilities.

	£ s. d.	£ s. d.
By Amounts due from Society—		
Printing *Transactions* Part II, and *Proceedings* Parts II and III	547 11 8	
Plates for Part I	150 13 0	
Sundry Accounts	105 16 4	
		804 1 0
„ Subscriptions received in advance		40 6 3
„ Excess of Assets over Liabilities—		
General Account	496 4 3	
Housing Fund	6,250 0 0	
New Meeting Room Fund	1,616 0 3	
Compounding Fund	1,473 2 8	
Library Fund	14 7 0	
Westwood Bequest Fund	162 18 7	
Hamilton Druce Bequest Fund	931 8 1	
Repairs to Premises Fund	41 8 0	
		10,985 8 10
		£11,829 16 1

* Estimated by Treasurer to be worth £5,000.

NEW MEETING ROOM FUND.

	£	s.	d.		£	s.	d.
To Transfer from General Account	1,167	19	8	By Balance at Bank overdrawn as per last Account	3	12	4
„ Interest on War Bonds	36	14	8	„ Cost of £1,099 4*s.* 2*d.* National War Bonds 1929	1,159	5	1
				„ Balance at Bank at date	41	16	11
	£1,204	14	4		£1,204	14	4

WESTWOOD BEQUEST FUND.

	£	s.	d.		£	s.	d.
To Balance at Bank per last Account	7	3	8	By Balance at Bank at date	14	7	4
„ Interest on £239 12*s.* 4*d.* Birmingham 3% Stock	7	3	8				
	£14	7	4		£14	7	4

LIBRARY FUND.

	£	s.	d.		£	s.	d.
To Balance at Bank per last Account	18	16	7	By Expenditure on new Books	145	8	10
„ Interest—Hamilton Druce Bequest	39	8	11	„ Balance at Bank at date	5	11	10
„ Transfer from General Account	43	18	8				
„ One half Admission Fees received in 1926	48	16	6				
	£151	0	8		£151	0	8

COMPOUNDING FUND.

	£	s.	d.		£	s.	d.
To Balance at Bank per last Account	46	15	5	By Investment in £47 3*s.* 9*d.* 5% National War Bonds 1928 ...	50	5	0
„ One half Admission Fees received in 1926	48	16	6	„ Balance at Bank at date	45	6	11
	£95	11	11		£95	11	11

REPAIRS TO PREMISES FUND.

	£	s.	d.		£	s.	d.
To Amount transferred from General Account	70	0	0	By Payment for Repairs to Premises	28	12	0
				„ Balance at Bank at date	41	8	0
	£70	0	0		£70	0	0

W. G. Sheldon, *Treasurer.*

We have audited the Treasurer's Accounts of Receipts and Payments and the Statement of Assets and Liabilities with the Books and Vouchers of the Society and certify them to be correct. We have verified the Deeds of the Property and the other Investments and Bank balances.

23, *Queen Victoria Street, London, E.C.* 4.
January 12*th*, 1927.

(Signed) W. B. Keen & Co., *Chartered Accountants.*

THE PRESIDENT'S ADDRESS.

Ladies and Gentlemen,

The Entomological Society, under the guidance of its Council and Committees, and especially the permanent Officers, the Treasurer, Secretaries and Librarian, continues to flourish, and we may hopefully look forward to the not-distant day when we shall meet in a well-planned and commodious hall and at the same time gain a capacious and convenient library. But whatever benefits the future may bring to the Society, the past year will, I believe, always stand out as the one in which our publications took their present convenient and dignified form, and I am sure that Fellows will join with me in congratulating all those who were responsible for the change.

In welcoming my successor to this Chair, I wish to thank my colleagues on the Council and Committees, and also all the Fellows who have attended the meetings, for the invariable kindness and courtesy which have made my term of office the happy memory it is and always will be, to me. I know full well that the same generous support will be given to the distinguished entomologist who will preside over our meetings in the ensuing years.

Eleven Fellows of the Entomological Society have died during the past year. How much we have lost in high distinction, brilliant promise, and helpful comradeship in the pursuit of a common interest, is imperfectly indicated in the following notices.

William Bateson,* M.A., Sc.D. (Camb.), F.R.S. The death, after a short illness, of this great and inspiring naturalist was a sudden and unexpected shock to biologists all over the world. Bateson had done so much and in so short a time to make the John Innes Horticultural Institute a great centre of research that naturalists looked with confidence to the growing achievements of future years. And surely we may believe that his spirit will live on in the institution created by him and that these hopes will still be realised.

Much has already been written and far more will be written of Bateson's life and work, so that it is unnecessary for me to prepare a brief abstract of notices which are sure to be read as a whole. It is more appropriate, on the present occasion, to speak of him as I have known him for forty years, at first diverging widely in

* *Times*, 9 February, 1926; *Entomologist*, lix, p. 97 (with portrait); *Ent. Monthly Mag.*, lxii, p. 64; Prof. R. C. Punnett, F.R.S., in *Edinburgh Review*, August, 1926.

opinions but with differences diminishing as the years went by. My earliest memory is of the time when he was preparing for his journey in Western Asia, looking for light upon the causes of evolution in the effects produced by the varying degrees of salinity in the lakes. Weismann's conception of heredity and its limitation was then unknown to us, and I remember Bateson using words such as these—"If an organism is the product of its environment, then in studying its evolution what is the use of morphology and embryology? We have only to select the right surroundings and we can produce anything." The investigation of the salt lakes did not fulfill these anticipations. Bateson told me on his return that the character of the bottom appeared to produce more effect on the Mollusca than the degree of salinity of the water. Moreover, Weismann's views had become well known and Bateson no longer believed in the transmission of acquired characters, but turned to the study of inherent characters and began the laborious collection of facts which led to his well-known volume on variation and discontinuity in evolution. Many writers hold that this study marked the beginning of his life-work, but, with all respect to their opinions, I believe that the true source of his inspiration came later in the rediscovery of Mendelian heredity. The teratological phenomena to which he attached such great significance—objecting strongly to the term Teratology as seeming to separate these phenomena from other kinds of variation—although of the utmost importance in enabling us to grasp certain elusive details in the development of the individual, do not, except in this respect, lead, as he then hoped, to an understanding of the process of evolution. In talking over some observations on the transmission of extra toes in cats I remember his opinion, illustrated by a drawing, that such supernumerary digits were the expression of a tendency towards the formation of two equal and opposed halves in hand and foot. He never, I believe, rejected the principle of natural selection but regarded it as self-evident, uninteresting, and very far from all-sufficing as the motive cause of evolution. Therefore he rightly sought in all directions for other causes.

My old friend Dr. R. C. L. Perkins has recalled, in the following words, the help Bateson received at this time from Dr. David Sharp:—"On my first return from Hawaii in October 1894 I worked in Sharp's room for four months. Bateson was continually there, often many times a day, and he really owed a good deal to Sharp's experience. The first time I saw Bateson, Sharp told me he was doing fine work and had become *the authority* on variation. Also how at some former time (I think two or three years before) Bateson had come into his room and said he thought he would start writing a work on variation. Sharp then asked him what he knew about it, and advised him to continue experimenting for a considerable time before he attempted to write at all on the subject, and I have no doubt that Bateson took this advice."

Important subjects on which we held opposed opinions were discontinuity in evolution and the hereditary transmission of small variations. I have said that Bateson accepted natural selection, although profoundly dissatisfied with it, and it is only right that the evidence should be on record. In 1892 he repeated some experiments on the influence of surroundings upon the colours of the larvae of *Amphidasys betularia* and admitted, although without enthusiasm, that this result of susceptibility to stimulus might reasonably be considered adaptive and

advantageous in the struggle for existence.* Then, only a few years ago, discussing the forms of *Precis sesamus* on Kilimanjaro, he rather surprised me by his readiness to believe that a local climatic difference, might, by altering the trend of selection, account for a local reversal in the time of appearance on the wing of the two seasonal forms of a butterfly.

Memories of Bateson would create a very imperfect impression if his keen sense of humour remained unnoticed. I recall from the earliest days his delight in Gilbert's young man who told the maiden—

> " You're everything you ought to be
> And nothing that you oughtn't, O ";

and her reply that the conclusion was

> " very creditable to
> Your powers of observation, O."

Again, J. K. Stephen's celebrated lines, not long after their appearance, prophesying a time

> " When the Rudyards cease from kipling
> And the Haggards ride no more."

Time and space alike forbid further recollections of this great and justly world-famed biologist. It would have been but a poor tribute to his memory if I had passed over differences as though they had not been. But I yield to no one in admiration for his great work on heredity, his power of inspiring others, especially the young, with his own enthusiasm, and the breadth of interest which made him, as his successor at Cambridge has well said, "a great humanist as well as a great naturalist."

A. E. J. Carter was a careful and accurate student of British insects, at first of the Hymenoptera, later of the Diptera, on which he published articles and short notes in the *Scottish Naturalist*, *Entomologist's Monthly Magazine* and other journals, recording several species of Diptera new to the British list. He had only retired from his position in the Bank of Scotland a few weeks before his death at the age of 62, and had been looking forward to increased opportunities for the pursuit of his favourite study. He presented his Hymenoptera to the Edinburgh Museum. His collection of Diptera has been acquired by Mr. J. E. Collin. In writing this brief notice I have received the kind help of Mr. Percy H. Grimshaw.

Charles Fenn, the Senior Fellow of the Society, elected in 1861, was a keen student of the British Heterocera and the discoverer of *Nonagria brevilinea*— " Fenn's Wainscot." A sympathetic notice of his life and chief interest has been written by Mr. R. Adkin.†

George Grace, B.Sc., who became a Fellow in 1918, had recently begun to

* *Trans. Ent. Soc., Lond.*, 1892.
The passages referred to are as follows :—" In the case of the sole, in the case of the larvae of *A. betularia*, and the like, there can be no doubt that the change of colour represents an 'attempt' on the part of the animal to approximate to the colour of its surroundings " (p. 212). Again, speaking of the brown and green *betularia* larvae,—" the resemblance to sticks in the one case and to green twigs in the other is unquestionable, and I think it may be fairly argued that this resemblance may contribute to the protection of the animal " (p. 214).

† *Entomologist*, lix, p. 120.

co-operate with Mr. F. W. Edwards in a series of papers on Culicidae and Ceratopogonidae, the first of which has just appeared in our *Transactions* (Pt. II, 1926, p. 389). He was a naturalist of wide interests and the joint author of several geological papers. In an excellent notice,* Mr. C. A. Cheetham tells of the pathetic circumstances of his death immediately after the delivery of a lecture on "the Aims of Science" in which he had, in his closing words, spoken of the wonder and beauty of the world revealed in ever-increasing measure to the student of science as his knowledge grows deeper.

Oliver Erichson Janson,† a Fellow since 1869, will be greatly missed by all who have known him as a regular attendant at our meetings, and even more by those he was always glad to help with his great knowledge of the Cetoniidae, of which he had made a life-long study. His other chief interest was Economic Entomology, in which he collaborated with Miss Ormerod and the Government authorities. Many years ago he assisted in the arrangement of the Godman-Salvin collections for the *Biologia Centrali-Americana*, and arranged the British Coleoptera and the Walsingham Lepidopterous larvae for the British Museum. His chief publications appeared in our *Transactions*, *Cistula Entomologica*, and the *Annals of the Genoa Museum*. The details of his entomological work have been kindly supplied by his son, Mr. O. J. Janson.

My friend Professor Selwyn Image has kindly recalled some of the memories of a close friendship of thirty years:—"Under that notably quiet, non-assertive retiring, sometimes even shy manner, lay a wealth of tender affection, kindliness, and generosity—a persistent determination and thoroughness in whatever he undertook,—a ready, skilful, practical helpfulness whenever one made a call on his assistance—that could not be surpassed. A genuine admirer and lover of Nature in all her aspects, his business as a dealer in Entomology was no mere means to him of livelihood, but a source of pure personal delight by reason of the close touch it brought him into with Nature—and this in more ways than one. It was delightful always to turn into that little office in Great Russell Street, and chat with him over the beautiful creatures that passed through his hands from distant countries. It was still more delightful to get him off for a day's holiday into the country—to go a-hunting, for example, after 'Buttons' amid the thorn-bushes of Epping Forest, and share with him his unaffected pleasure not only in that laborious search, but in the beauty of the landscape of this happily still unspoiled bit of traditional English scenery. Or to think of him in another aspect. Janson was profoundly devoted to the sea. When opportunity offered, nothing gave him more pleasure than the chance of a voyage aboard. And the rougher the water the more he rejoiced in it. Nothing, he has more than once assured me, made him feel so well as wind and waves, when they were in a rampagious mood.

"Again, he was an admirable practical gardener. His success with that little bit of a garden attached to his house up at Highgate was without exaggeration a marvel—alike for vegetables, flowers, and fruit—and for general charm of aspect. By his skill and his labour he had turned it into a veritable 'pleasaunce.'

"The news that came to me of my friend's death—so sudden, so entirely unex-

* *Naturalist*, Dec. 1, 1926, p. 362. † *Hornsey Journal*, 3 December, 1926.

pected—on November 25th shook me indeed. Only eight days before he and his wife had been at a lecture of mine on Thomas Bewick—whose wood-engravings he vastly admired—at the Old Water-colour Society's gallery in Pall Mall, and he seemed then so cheerful and well. Nay, on the very morning of the 25th he got up —more than ordinarily, I understand, in good spirits—and was dressing himself, when instantaneously the stroke came, and in less than an hour he was gone."

George Lewis,* a Fellow of our Society for half a century, was a distinguished Coleopterist and the chief authority on the HISTERIDAE of the world. His interest having been aroused in his youth by collecting British beetles, the opportunity for a wider study came in 1862 when the calls of business took him to China where he lived for ten years. Soon after his marriage in 1874 he travelled with his wife for some years in Japan, making the first great collection of Coleoptera from this interesting part of the world, a collection increased by a visit to Ceylon on his way home. After much labour spent in working out his captures he finally concentrated upon the HISTERIDAE, describing 60 genera and over 750 species. His general collections he sold to the National Museum, refusing to allow them to leave the country although offered a larger sum by a continental institution. The HISTERIDAE, embodying the chief work of his life, are bequeathed to the same great museum which possesses his other Coleoptera. Mr. G. J. Arrow, in his excellent notice referred to in the foot-note, points out that George Lewis was probably the last surviving contributor to the first volume of the *Entomologist's Monthly Magazine*, his paper (p. 262) being written at Nagasaki and dated July, 1864.

The Rev. Francis David Morice,† M.A. (Oxon), F.Z.S., a Fellow from 1889 and President of the Society in 1911 and 1912, will be sadly missed at our meetings and other gatherings of entomologists which he delighted to attend. He represented the Society at the two-hundredth anniversary of the birth of Linnaeus, celebrated at Upsala in 1907, at the two hundred and fiftieth anniversary of the foundation of the Royal Society in 1912, and the Second International Entomological Congress at Oxford, in the same year. The excellent and characteristic portrait which faces p. 268 of the *Entomologist's Monthly Magazine* (lxii) was taken by Admiral Walker, his neighbour at Woking, just before Mr. Morice started for Zürich to attend the Third International Congress in July, 1925. He was a great traveller and, accompanied by entomological friends, collected his favourite Hymenoptera in many parts of the western Palaearctic Region.

Mr. Morice was educated at Winchester and New College, Oxford, gaining in 1871 the Chancellor's Prize for a Latin Essay and becoming in 1872 the first Craven Scholar. He was elected a Fellow of the Queen's College in 1871 and was, at the time of his death, only surpassed in seniority by three members of the Governing Body. After teaching classics in Oxford for three years he became in 1874 an assistant master at Rugby School under Jex-Blake. In the earlier part of the twenty years at Rugby his well-known classical works were written, to be followed

* *Ent. Monthly Mag.*, lxii, pp. 242 and 270.

† *Ibid.*, pp. 242 and 268; *Entomologist*, lix, p. 328 (giving the date of Mr. Morice's death 23 instead of 21 Sept.); *Times*, 23 and 28 September, 1926.

by the awakening of a new interest which remained with him to the end. Arthur Sidgwick, a keen entomologist as well as a distinguished classical scholar, had been the presiding genius of the Rugby School Natural History Society, and when Morice became President, he turned his attention to the subject, not at first because of any special interest in it, but from the conscientious desire to perform efficiently the duties of the position he had accepted. He made a beginning with the Lepidoptera, but fortunately turned for advice to Edward Saunders, F.R.S., from whom he received the same generous help which this eminent naturalist delighted to give to every student who applied to him. They first met by arrangement at the Rugby station where Saunders had to change on his way to Buxton, and it was here that Morice was advised to begin the study of the Hymenoptera. Soon afterwards he visited Saunders at Woking, and in 1894, when he left Rugby, took a house next door to that of his friend and teacher; and now after the lapse of more than thirty years his grave is where he would have wished it to be, next to that of Edward Saunders in Brookwood Cemetery.

Morice also received much help from Dr. R. C. L. Perkins, F.R.S., who writes :— "I corresponded with Morice very soon after he began to study the Hymenoptera. Probably Edward Saunders asked him to send doubtful things to me, because he thought it would be good practice for me! This, perhaps, would have been about 1888–89. At any rate I remember I received a lot of Andrenas from him to name from Rugby, soon after I published a little paper in *E.M.M.*, xxv, p. 128, 1888." Dr. Perkins also recalls an incident which illustrates Morice's free and kindly intimacy with his friends :—"I was telling him that I hardly ever visited friends or relations because I had been laid up in their houses. He replied that Edward Saunders had had measles when staying with him. 'So,' he said, 'you can be as ill as you like here, and I shall simply get a nurse in to look after you and it won't worry me!' Or words to that effect."

It is not necessary to speak on this occasion of Morice's excellent work at first on the CHRYSIDIDAE, then upon the bees and Fossores, and finally upon the TENTHREDINIDAE. Much of it is preserved in our own publications and the rest mainly in the pages of the *Entomologist's Monthly Magazine*. It is very regrettable for the study of the sawflies that he was unable to finish the handbook to which he had devoted so much time and thought. It is, however, possible and must be our earnest hope that the notes which he has bequeathed with his collections and scientific library, to his old University may be a sufficient guide for the completion of this much-wanted volume. On the death of Edward Saunders he purchased and presented to the Natural History Museum the whole of his friend's fine collection of Hymenoptera.

The kind help of Mrs. Edward Saunders and Dr. Perkins has enabled me to correct a slight error in some of the earlier notices. The passing on of an enthusiasm for scientific research is a fascinating and instructive subject and it is hardly possible that a better example will be found than in the story of the influence through which Morice became a Hymenopterist.

Major John Coney Moulton,* O.B.E., M.A., D.Sc. (Oxon), whose unexpected

* *Ent. Monthly Mag.*, lxii, p. 242; *Entomologist*, lix, p. 232.

death on June 6, following an operation a few days after his arrival in England, was such a shock to his many friends, was born 11 December, 1886, and educated at Eton and Magdalen College, Oxford. He was not greatly interested in the ordinary undergraduate curriculum, but I well remember the zest with which he threw himself into original work. His first opportunity was afforded by the great collection of Brazilian butterflies made by W. J. Burchell between 1825 and 1830. He never forgot this early interest and would often remind me of his plan that we should one day travel together through the heart of Eastern Brazil in the footsteps of the great naturalist. He became a Fellow in 1907, and his first important paper, appearing in our *Transactions* for the following year but published in 1909 (p. 585), was a finely illustrated account of the chief groups of mimetic butterflies in tropical America—not those of Borneo as recorded in the *Entomologist's Monthly Magazine*. In 1909 he became Curator of the Sarawak Museum at Kuching, enjoying the administrative work and writing many papers chiefly on systematic subjects, until the Great War called him to serve as a Captain in the 4th Wiltshire Regiment, and later to be transferred as a Major to the General Staff of the Straits Settlements' Command. In 1919 he succeeded Dr. R. Hanitsch as Director of the Raffles Museum and Library at Singapore, and four years later became Chief Secretary to the Rajah of Sarawak. The claims of administration and Systematic Entomology, both appealing strongly to him and calling forth all his keenness and energy, left little opportunity for bionomic research, but, had he lived, I have no doubt that he would have returned to the subject of his earliest enthusiasm and his first important memoir.

E. Piazza, who became a Fellow in 1922, possessed an extensive knowledge of the Lepidoptera of Southern California, Arizona and Texas, from which he was able to supply interesting species to American and European museums.

Lieut.-Col. F. Winn Sampson, who died at Sydenham, aged 73, was a Barrister-at-Law and served as Police Magistrate in West Africa. He was for many years a member of the Royal Microscopical Society, and became an Entomologist on his retirement from active life, making a special study of the Scolytidae. W. F. Blandford, when unable to continue working on the group, gave his important collection to Col. Sampson who made great additions to it. This collection, together with his Entomological Library, is bequeathed to the Natural History Museum. Col. Sampson had, at the time of his death, nearly completed a volume on Scolytidae for the Fauna of British India series. Mr. G. J. Arrow has kindly helped me in preparing this brief notice of one who was always ready to assist others with his intimate knowledge of the Scolytidae, and will be greatly missed by his fellow-workers.

Dr. Cyril Luckes Withycombe,* Ph.D., M.Sc., D.I.C., one of the most brilliant of the younger entomologists, died suddenly at Cambridge on 5th December. He was twenty-two when elected a Fellow in 1920, and many I am sure will recall the great interest of his first communications and the pleased surprise that the Society

* *Times*, 7 December, 1926. The quoted passages, except those from a letter, are from this notice. *Entomologist*, lx, p. 25 (with portrait).

should receive so much from so young a member; also the clearness of his exposition and the charming modesty of his bearing, together with the sure instinct which had led him to select the Neuropterous groups as his special province. After serving in the Great War in the ranks of the 16th Battalion of the London Regiment, he became a student in the Imperial College of Science under the late Professor Maxwell Lefroy who looked upon him as his best and favourite pupil. The high quality of his first researches, assisted by grants from the Department of Scientific and Industrial Research and published in our *Proceedings* and *Transactions*, was at once apparent and led to his appointment in 1923 as Lecturer in Entomology at the Imperial College of Tropical Agriculture in Trinidad. Here, in addition to his teaching, he continued the researches begun in England, and "turned his attention to certain economic pests of cotton and sugarcane, publishing a study of the Froghopper blight in Trinidad, remarkable for its critical examination of the factors concerned, the bionomics of the canes themselves, their cultivation, and the incidence of the pest. His conclusions are not likely to be popular amongst planters, as they preach the greatest attention to the cultivation of the canes rather than the use of sprays, &c., to kill off the insects."

Dr. Withycombe returned home in 1926 and in October entered upon the duties of the newly created post of Lecturer in Advanced and Economic Entomology at Cambridge. He was present at the meeting of the Society on 1st December when he gave an account of the ravages of Limacodid larvae in Trinidad and the difficulty in persuading the planters to deal with the pest in the only effective way. He wrote to me on the following day offering to send "a few alcoholic extracts of *Heliconius* and *Dione* glands" for analysis, and, on his return to Cambridge in the afternoon, to look up his "notes on the esters suspected to be present." This is only one out of many instances of the help which he was always ready to give to others in their work in spite of the increasing demands upon his own time. "Zoology mourns the loss of one of its most brilliant children and Cambridge that of one of its most promising workers."

Outside our own Society Entomological science has lost, during the last year and a quarter, three distinguished workers.

Dr. Ernest Evald Bergroth,* the eminent Finnish Hemipterist died at Ekenäs, on 22 November, 1925, aged sixty-eight. "His death," Mr. W. E. China has written, "is a severe blow to those younger Hemipterists who have learnt to rely on the wisdom of his judgment, and to whom his advice was never refused" (*E.M.M.*, lxii, p. 64).

The Abbé J. J. Kieffer. An account of the work accomplished by this distinguished French student of the Diptera and Hymenoptera who died 30 December, 1925, has been written by Mr. F. W. Edwards.†

Dr. Henry Skinner ‡ who died in Philadelphia 29 May, 1926, was a keen Lepidopterist well known to many in this country. He wrote to me early in the Great War warmly sympathising with our cause and enclosing a contribution for some deserving object which had grown out of the struggle. He was a naturalist from

* *Ent. Monthly Mag.*, lxii, pp. 45 and 63; *Entomologist*, lix, p. 48.
† *Ent. Monthly Mag.*, lxii, p. 44.
‡ *Entomologist*, lix, p. 232.

whom it was possible to differ in a friendly spirit, as I found in our controversy on the origin of the mimetic *Basilarchia* (*Limenitis*) *archippus* from *B.* (*L.*) *arthemis*.*

I have chosen for my address a subject which, at first sight, appears to be unduly special and restricted. I hope, however, that this impression will be modified by a perusal of the following pages, and that the subject, as it unfolds itself, will be seen to have a very direct bearing upon biological problems of the widest interest.

On certain effects of Shock upon Insect Development.

It is necessary to state at the outset that the words "Insect Development" as here used do not refer to the evolution of any species or group of species, but to the development of the individual. Shock may nevertheless shed much light upon evolutionary history, inasmuch as it may reveal ancestral characters which would otherwise remain hidden. It is also possible that the germ-substance itself may sometimes be influenced by shock, falling into a more stable condition, which, by continuity of the germ-plasm, would be transmitted to future generations. If this should happen, shock would of course be a factor in evolutionary history.

The word "shock" as employed in this address includes all forms of abnormal mechanical, physical, or chemical stimuli.

Ancestral Characters revealed by Shock.

August Weismann, in his paper "On the Seasonal Dimorphism of Butterflies," recognised that reversion may be probably caused by shock. This memoir is the first of Weismann's "Studies in the Theory of Descent," translated with valuable notes by my dear friend the late Professor Raphael Meldola and published in 1882—a book which led me back, with new ideas and a heightened enthusiasm, to Entomology, the beloved study of my youth. Weismann records his belief (*ibid.*, pp. 37–38) that the unusually hot summer of 1869 caused reversion towards the winter form in several specimens of *Araschnia levana*, and that in 1872 the vibration of a railway journey caused the pupae of *Pieris napi* to produce the winter form of the species. "The whole course of development was precisely as though cold had acted on the pupae; and in fact, I could find no other cause for this quite exceptional deportment than the seven hours' shaking to which the pupae were exposed by the railway journey, immediately after or during their transformation." Weismann spoke of the effects thus induced as "reversion," believing them to be a return to or towards the more ancestral of the two seasonal forms assumed by these butterflies in Central Europe. But it is possible that shock may cause reversion to something more remote—to a character or group of characters left far behind in the history of the species.

Nearly forty-four years ago I was stirred by Weismann's "Studies" to repeat some of his experiments on seasonal dimorphism, using species differing from those selected by him—work subsequently carried out far more thoroughly and successfully by Dr. Standfuss and by one of our Presidents, F. E. Merrifield. Among the species submitted to experiment was *Ephyra pendularia*, and I well remember the difficulty in procuring ice during a visit to Freshwater in the summer of 1883, and the morti-

* *Journ. Acad. Nat. Sci. Phila.*, 1912, p. 121; 1914, p. 161; *Ent. News*, xxiv, 1913, p. 23.

fication when the coach once arrived without the precious parcel. Much other work going on at the time interfered with the systematic conduct of these experiments and no account of them has been published. One interesting result was, however, observed. A batch of *pendularia* pupae which had been exposed to cold for a longer period than the others yielded one, or perhaps two moths of a dark leaden grey very different from any varieties of the species known to me. I was reminded of them directly I saw Professor J. Heslop Harrison's deeply interesting results obtained by treating the food of other Geometrid species with a manganese salt.* Is it possible that prolonged cold had produced in *pendularia* the results which he had proved to be hereditary and to follow Mendelian laws? It is to be hoped that the experiment will be repeated on a large scale and for a sufficient time. It is probable that the darkened *pendularia* and possible that Professor Harrison's melanic forms were the effect of shock, perhaps causing a return to some stable phase in the past history of the species. Fellows will remember that this latter interpretation of certain variations, which at first sight appear to be new departures, was held by that far-seeing naturalist, the late Dr. T. A. Chapman, F.R.S., and was indeed brought forward by him in one of his last letters.†

The possibility that the germ-plasm may have been thus changed by shock is only thrown out as a suggestion worthy of an adequate experimental test. If, however, it should be hereafter proved that prolonged cold may, in certain instances, produce the same effects as a chemical salt, it would be clear that, in Weismann's words: "it is the constitution of the species, and not the external agency . . . which plays the chief part. The latter, as Darwin has strikingly expressed it, rather performs the function of the spark which ignites a combustible substance, whilst the character of the combustion depends upon the nature of the explosive material" (*ibid.*, p. 59).

A reversion towards the ancestral form has been induced by shock in the females of *Papilio dardanus*, which are tailed like the males in Madagascar, the Comoro Islands and Abyssinia, but elsewhere in Africa are almost invariably tailless like their Danaine and Acraeine models. Vestigial tails are, however, occasionally borne by females belonging to forms which are, in other respects, relatively ancestral—*trimeni* ‡ and *hippocoon*.§ But the most convincing evidence that the tailless mimetic females have been derived from tailled forms was provided by W. A. Lamborn who wrote from Moor Plantation, near Ibadan, S. Nigeria, on 9 December, 1913—"The pupal wing-cases are the same in shape in both sexes, but whereas, in the male, the tails can readily be seen on either side of the mid line on the night before emergence, in the female the space for their reception, though present in an equal degree, is unoccupied by wing-tissue, a little point which seems to me to support the contention that more ancestral forms of female were tailed." ‖ When it is also remembered that degenerate female antennae and wings lie loose within much larger pupal organs,¶ I believe that it will be generally admitted that Lamborn's argument is valid, that the females of *dardanus* were originally tailed, and furthermore that the vestigial tails of

* Harrison and Garrett, *Proc. Roy. Soc. B.*, vol. xcix (1926).
† *Proc. Ent. Soc., Lond.*, 1922, pp. viii–xiv.
‡ *Trans. Ent. Soc., Lond.*, 1906, pl. xviii, fig. 1.
§ *Ibid.*, figs. 2 and 3.
‖ *Proc. Ent. Soc., Lond.*, 1914, p. lxvii.
¶ *Trans. Linn. Soc., Lond.*, 2nd Ser., Zool., vol. v, Pt. 7, 1891, p. 245.

hippocoon figured in our *Transactions* for 1906 (pl. xviii, figs. 2, 3) were due to reversion. That such reversion may be induced by shock is, I think, proved by the slight traces of tails which appeared in some of the *hippocoon* females * in two out of six families bred by W. A. Lamborn in S. Nigeria, and in some of the families bred in S. E. Rhodesia by C. F. M. Swynnerton.† These Rhodesian families had evidently been subjected to abnormal conditions. Mr. Swynnerton describes the persistent attacks of Ground Hornbills, and it is certain that the larvae did not obtain the normal amount of food, for the butterflies are much below the average size. Mr. Lamborn subjected one of his two families to artificial cold, but it is uncertain whether the effect was produced by this or by some other condition. A third family bred by him in the same area is of especial interest; for *very* slight vestiges of tails are seen in one or two of the more ancestral of the two female forms which appeared, but not in any of the other form.‡ Cold was also applied to some of these pupae, but there is no evidence that any effect was produced by this means.

When we consider the great rarity of such vestiges in the wild state as compared with the number that have been produced in the bred families, it is clear that some cause associated with the artificial condition is responsible—a conclusion which it is hoped will be tested by attempts to recall the ancestral features of other species. A favourable subject, which I have hitherto unsuccessfully suggested to American friends, is *Basilarchia* (*Limenitis*) *archippus*.§ This well-known mimetic butterfly, except in one locality in the Albany district, still retains on the hind-wing the black discal band of its "White Admiral" ancestor *arthemis*. It is possible that some shock applied to the larva or the pupa at the sensitive period may cause reversion to a more pronounced form of this marking and may even recall some trace of the broad white band which in *arthemis* borders it internally—features which are still retained on the under surface of some examples and apparently always on both upper and under surfaces of the more ancestral Arizona form *B.* (*L.*) *obsoleta* (*hulsti*).

Heat and cold, electrical stimuli, ultra-violet light and other forms of radiant energy, chemical substances such as have been so successfully employed by Professor Heslop Harrison, vibration and other mechanical stimuli of varied kinds, strength, and duration—all suggest themselves as suitable for experiments devised to test and retest the recall of ancestral characters, as well as the very different and startling results described in the following section.

The Effect of Mechanical Shock upon the development of the Secondary Sexual Characters of Papilio dardanus.

The deeply interesting and indeed exciting experimental production by Dr. V. G. L. van Someren of forms hitherto known in collections as gynandromorphs ||

* *Trans. Ent. Soc., Lond.*, 1913, pl. xl, figs. 11–15, 17–21.

† *Proc. Ent. Soc., Lond.*, 1914, pp. lvii–lxiii.

‡ *Ibid.*, pp. lxiii–lxvi; *Proc. Linn. Soc., Lond.*, Session 128, 1915–16, pl. i. The vestige, indicated by the angulated outline of the hind-wing, is best seen in fig. 18.

§ *Proc. Acad. Nat. Sci., Philadelphia*, Jan., 1914, pp. 178–192, and references.

|| The word "gynandromorph" is only used in the above sense in the following pages. It may well be that the whole relationship between "gynandromorph" and "intersex" will require reconsideration in the light of Dr. van Someren's remarkable results.

was recorded by him in the following brief Editorial note * published in Nairobi, November, 1924 :—

" During recent experiments, it was found that in cases where the pupae had suffered a severe shock just when the larvae had changed to pupae and were still soft, the resultant butterflies showed distinct traces of male pigmentation varying from a small patch of yellow, to complete male coloration of one, two, three or all the wings. Also, that in cases where there was only slight male pigmentation, tails were present.—(*Editor.*)"

I had not at the time seen the results of these experiments, but when they arrived, it was clear that the nine specimens A to I, described in Appendix I (p. 86), form a series from a minute trace of gynandromorphism up to a very nearly complete half-and-half example. The development of the secondary sexual characters in the series leads to the inference that four specimens (A, B, C, D) † are females with male admixture, five (E, F, G, H, I) ‡ males with female admixture.

During his recent visit to this country Dr. V. van Someren explained to me the nature of the " severe shock " to the pupae which had caused these astonishing results and since his return has kindly given a detailed account in the following letter :—

" 26 *November*, 1926 : *Nairobi.*

" Your letter of 26 October came just as I was in the midst of starting a batch of twelve *dardanus* ♀♀s to lay—this with the idea of continuing the experiments on the production of gynandromorphs; so you see I've lost very little time in getting down to the thing.

" Now with regard to the methods.

" (1) *Period at which shock is given.*—The time during which the larval skin is being cast and the pupa still soft and unset.

" (2) *Nature of shock.*—A sudden vibration caused by knocking several times on the side of the box or glass with the knuckles or a mallet of medium weight. Thus the degree of vibration is uncertain and variable.

" (3) The larvae must be suspended from the side or top of box—*not fixed to a twig*, unless this is short and securely pinned to box.

" (4) Pupae which fell were imperfectly attached, because they were still engaged in casting the larval skin and thus were only suspended by the body-girdle, through which they slipped. As a result, some pupae produced deformed but others normal butterflies. The maximum fall was 9 in., this being the height of the boxes.

" When once the pupa is securely attached and has become rigid it seldom becomes detached, but until the skin is actually dropped the weight of the insect is carried by the body-girdle, through which it will often slip if inclined head or tail downwards, more often if the latter.

* *Journ. E. Afr. and Uganda Nat. Hist. Soc.*, No. 20, p. 15 footnote.

† A, B, and C shown respectively in figs. 1, 2, 3 of Plates II and III. I had hoped to show in these figures, and especially in fig. 1, the very slight male yellow admixture, by photographing its brilliant fluorescence; but these rays which are so striking to the eye were powerless to affect the sensitive plate. No better result was obtained with a quartz lens, or by an hour's exposure to the fluorescence with the ultra-violet prevented from reaching the plate by a Wrattens " Filter yellow K2." The negative results suggest an interesting problem for physical research.

‡ Shown respectively in figs. 4, 5, 6, 7, 8, on Plate II, and H also on Plate III, fig. 4.

" I shall in future keep detailed records of the degree of shock, &c., &c., and consequent results, if any, and send them on to you."

There can be no possible doubt that these nine gynandromorphs were produced by the blows given to the boxes or perhaps in some instances by the fall of the pupae. In all my experience of *dardanus* only a single gynandromorph has been met with—the *planemoides* female with male admixture on the left side, taken by Capt. T. T. Behrens in S.E. Uganda.* Furthermore, it is shown in Appendix I that most of these results were obtained in precisely those members of a family which alone were submitted to experiment or accidentally fell as pupae, while the other members produced normal butterflies.

The exciting novelty of the results and the opening by them of a whole vista of experimental research will be realised by a perusal of Appendix II (p. 91), giving a brief account of our existing information on the subject, very kindly prepared by Dr. E. A. Cockayne.

The great variety in the results produced, as may be inferred by comparing the figures on Pl. II, suggests that mechanical shock will prove to be a very comprehensive cause, alike of mosaic, partial and complete gynandromorphism.

There is some indication that the characters of the opposite sex appear chiefly or entirely on the side which has been more effected by the shock. Thus in male H (Pl. II, fig. 7; Pl. III, fig. 4) a nearly complete, and in male I (Pl. II, fig. 8), except for the male armature, an entirely complete gynandromorph, the wings which have become nearly or totally female show a similar deformity, caused by the inability to expand normally at a particular point—either the result of falling or due to the pressure of the girdle on that side of the soft pupa, combined with the effect of a shock-caused vibration upon the part of the surface thus subjected to pressure. We may compare also the imperfectly expanded right hind-wing of F with its female admixture (Pl. II, fig. 5). These results suggest experiments in which mechanical shock is as far as possible restricted to one side of the pupa; also experiments such that the vibration waves would be directed towards the right side of some pupae and the left of others. But the possibilities of future experiment on the subject are well-nigh endless.

It will be observed that certain results obtained by shock were possibly due to reversion towards an ancestral condition, not necessarily remote, rather than to the production of gynandromorphism. I refer to the immense development of the discal black band in the hind-wings of male F (Pl. II, fig. 5), rendering it very different from the 57 other males in the same family. It will be noted, however (pp. 88, 89), that there is unfortunately some doubt about the family to which this specimen belonged.

The reappearance of such an ancestral character as the tails of the mimetic females of *dardanus* may apparently be caused in three different ways:—

(1) Spontaneously, by a favourable combination of germinal factors, as in the tailed *trimeni* and *hippocoon* referred to on p. 80 and represented in *Trans. Ent. Soc.*, 1906, pl. xviii, figs. 1, 2, 3.

(2) The result of shock incidentally caused by artificial conditions, as in

* *Trans. Ent. Soc., Lond.*, 1906, p. 297, pl. xviii, fig. 4.

Lamborn's and Swynnerton's experiments; p. 81, and *Trans. Ent. Soc.*, 1913, pl. xl, figs. 11–15, 17–21.

(3) The incidental result of gynandromorphism due to severe mechanical shock as in van Someren's experiments, or to the falling of the pupa.

This last reappearance can be at once distinguished from (1) and (2), in that it is always more or less asymmetrical, and in its extreme form confined to one side.

In the above comparison I refer only to the commoner asymmetrical gynandromorphs. The rarer bilaterally symmetrical examples, such as those bearing the antennae of one sex on the head and body of the other, have not yet been produced by shock and perhaps belong to a different category. The complete substitution of one sex for another in any part would appear to be a very different change from the one which leads to the partial or half-and-half splitting up of part or the whole of the secondary sexual characters into male and female.

Dr. V. van Someren's results throw a strong light upon the pupal condition, at any rate in the species upon which he experimented. The well-known fact that the male parent transmits female characters as fully as the female parent, and the female parent male characters as fully as the male, is seen to be associated with another fact—that, in their secondary sexual characters these parents themselves are potentially as much one sex as the other, and, if a shock were administered to the pupa at the right moment, one side of the resulting butterfly would be male and the other female. How far the primary sexual organs are involved is a matter for future investigation.

There does not seem to be any escape from the inference that the pupal factors which determine the secondary characters of sex are in a condition analogous to that of a Mendelian heterozygote, the male characters dominant in the normal male—the female in the normal female, but that the underlying characters are revealed and shown to be as well represented as the overlying ones by a correctly timed mechanical shock.

We are thus led to a conception of the chrysalis very like that set forth by Aristotle about 350 years B.C. :—

"For insects produce grubs in the first instance, but the grub, when it has developed, becomes like an egg; for the so-called chrysalis has the function of an egg; and out of this the animal is produced, thus reaching the end of its development in the third metamorphosis." *

It is interesting to speculate on the possibility that the gynandromorphs of insects are generally or perhaps always produced by shock. At present it can only be a speculation, but one which, it is hoped, may lead to specially directed observations.

The following brief notes afford some slight indication of the rarity of gynandro-

* *De Gen. Anim.*, Bk. II, ch. i, § 12 (p. 733 b. 14). *τὰ γὰρ ἔντομα σκωληκοτοκεῖ τὸ πρῶτον· προελθὼν δ' ᾠώδης γίνεται ὁ σκώληξ (ἡ γὰρ χρυσαλλὶς καλουμένη δύναμιν φοῦ ἔχει)· εἶτ' ἐκ τούτου γίνεται ζῷον, ἐν τῇ τρίτῃ μεταβολῇ λαβὸν τὸ τῆς γενέσεως τέλος.* The production of the grub is counted as the first metamorphosis. I have to thank my kind friends Professor H. Joachim and Mr. A. W. Pickard-Cambridge for finding and translating this passage for me.

morphs and their distribution among the groups of insects. No attempt has been made, except in one or two instances, to record anything more than general impressions and personal experiences. The Annual Address does not afford the opportunity for any detailed treatment of so wide a subject as insect gynandromorphism.

My friend Dr. G. A. K. Marshall has kindly asked the specialists in the Insect Department of the Natural History Museum for their experience of gynandromorphism, with the following results :—

" Among moths, Tams does not know of it in any species sheltered by very hard cocoons, such as Limacods, or in borers, such as Cossids and Hepialids. It has been more frequently found in butterflies than in moths, and probably occurs in all the families, though records in HESPERIIDAE are not known.

" In beetles neither Arrow, Blair nor myself can recall any cases. Nor does China know of any in Hemiptera, and Laing has not observed it in Coccids or Aphids. Unfortunately both Edwards and Austen are away, so I can get no information about Diptera, but I know of no instances myself. Uvarov knows of no example in the ACRIDIDAE, although they are recorded in the TETTIGONIIDAE (LOCUSTIDAE)." *

Dr. R. C. L. Perkins infers that gynandromorphs are very rare in bees and wasps. He estimates that between 1885 and 1900 he had captured or examined 20,000 Hymenoptera, but had only twice met with an example. He believes that he has only seen two complete right and left gynandromorphs, one of these being *Bombus lapidarius* in which not only were the superficial characters of one side different from those of the other, but also the male genitalia were represented by half the armature and the female by a sting. Dissection would have been required to determine whether a half or whole sting was present. All transitional stages occur between an example such as this and a very incomplete one with, *e.g.*, the head equally divided and the rest of the insect of one sex. There is also an antero-posterior asymmetry, as in a specimen of *Andrena albicans* with the head and thorax male, and the abdomen female.†

The ants have been studied so intensively that a more detailed account of gynandromorphism is justified, and my friend Mr. Donisthorpe has kindly given, in Appendix III (p. 92), a brief account of existing knowledge on the subject. Their rarity in this group is shown by the fact that my friend Mr. W. C. Crawley has only observed a single instance in all the collections submitted to him.‡ Mr. Donisthorpe informs me that he has twice taken two gynandromorphs on the same day, suggesting the existence of a germinal tendency in the family, or a common

* Keil records five examples in which the external genitalia differ on the two sides (*Intern. Entom. Zeitschr.*, **8**, 1914, pp. 145–146, 152–153, 171); Ramne records one in which the same difference was accompanied by the presence of ovaries and testes (*Sitz.-Ber. Ges. Naturforsch. Freunde*, Berlin, 1913, No. 2, p. 83), also another, with external characters entirely male, which possessed ovaries (with fewer eggs than in females) as well as testes (*Arch. f. Naturgesch.*, **86**, A, 1921, pp. 164–165).

† This example and many others are described by Dr. Perkins in an interesting paper on " Hermaphroditism in Bees and Wasps " published in the *Journ. Torquay Nat. Hist. Soc.*, 1922. The paper records several gynandromorphs taken by the author at a later date than 1900.

‡ *Entomologist's Record*, xxxii, No. 12, p. 217. This paper includes references, drawn up by Mr. Donisthorpe, to the literature of the 42 gynandromorphs known at the time when Mr. Crawley recorded the 43rd example.

external cause. Dr. van Someren's discovery supports the latter interpretation, rendering it probable that ant gynandromorphs are caused by accidents to pupae in the sensitive condition, as they are being carried about by the workers, or in other ways, when the nests are disturbed. In the ant pupa the factors which determine the female form—but here much experimental work is required—may probably have been already fixed by the food given to the larvae (see Appendix III, p. 92) or by some other condition imposed upon them by the workers. Dr. van Someren's gynandromorphs are also combinations between males and female forms of different kinds, but there is here no evidence to suggest that these forms are produced by larval conditions, and, on the other hand, convincing proof that they are due to germinal factors transmitted according to some form of Mendelian inheritance.

Referring again to experiences of the Lepidoptera, Mr. H. T. G. Watkins informs me that three friends have each taken one butterfly gynandromorph, two being British Lycaenidae, and one an Indian *Colias*. Commander J. J. Walker has himself combined these experiences, although his *Colias* was taken at Gibraltar. Mr Watkins has met with a rough estimate of the proportion of gynandromorphs, viz. 1 in 28,000, but the data are not available.

Neither Mr. J. H. Durrant nor Mr. E. G. R. Waters has ever met with a gynandromorph among the Microlepidoptera, and it is probable that these as well as the Hesperiidae are protected from severe shock by their methods of pupation.

Should it be hereafter proved that the conspicuousness of gynandromorphism n butterflies and the fact that butterflies are more collected than other insects do not account for the relatively high proportion of such forms among them, it is likely that the explanation will be found in their exposed pupal life and the liability of both the girdled chrysalides and those suspended head downwards to fall at the sensitive period when the larval skin is being shed and the new attachment sought by the anal extremity of the pupa.

The discovery which forms the main subject of this address is a striking example of the results which spring from the sympathetic contact between scientific workers; for the results obtained by W. A. Lamborn and C. F. M. Swynnerton provided the stimulus which led Dr. van Someren to undertake other experiments on the same species—experiments which not only throw a brilliant light upon the mysterious processes of insect development, but also, I believe, point the way to further researches and a surer knowledge of development in general.

APPENDIX I.

A Description of the nine Gynandromorphs of *Papilio dardanus* artificially produced by Dr. V. G. L. van Someren.

Females A, B, C, and D, with admixture of male characters.—The first three examples belonged to the little "Family 13:1925," of which the parent was not received. It consists of 2 males (emerging 10 April), approaching the E. coast form *tibullus*; 3 *cenea* females (10 April); and 4 females (10, 10, 17, and 19 April) approaching the E. coast form *hippocoonoides*. It may be inferred from the

patterns and from Dr. van Someren's localities that the parent was taken in the Nairobi district. D was one of another family from the same area.

A (Pls. II and III, fig. 1).—The least pronounced of all the nine gynandromorphs is one of the three *cenea* females, bearing, on the upper surface, a narrow, irregular, crack-like, broken streak of yellow male scales in area 1*b* of the right fore-wing, and a minute patch near the apex of the left hind-wing cell, a few scales overlapping into area 4. The under surface of the right fore-wing alone exhibits traces of gynandromorphism, there being an admixture of yellow scales forming minute spots and slight streaks in the cell, the largest streak being prolonged into area 6; also yellow scales partially replacing the white scales of the chief marking in the cell and the four round its apex in areas 4, 5, 6, and 8. The yellow scales also invade the dark ground-colour on the basal side of the spots in areas 4, 5, and 8. The crack-like streak in area 1*b* is replaced on the under surface by a similar but smaller streak below the discal spot, this streak being accompanied by a minute dot close to vein 1. All these small or minute yellow markings fluoresce brilliantly in ultra-violet light. This *cenea* female, forming the beginning of the series, is described in some detail. It is obvious that the slight gynandromorphism is almost confined to the right fore-wing.

The two remaining and far more pronounced gynandromorphs of this family are the *hippocoonoides*-like females B and C.

B (Pls. II and III, fig. 2).—Emerged 19 April. The chief admixture of male colouring (ochreous and dark brown) is on the under surface of the right hind-wing which also possesses a well-marked rudimentary tail. The next, but much smaller admixture takes the form of a yellow streak on the under surface of the left fore-wing cell. Three elongated patches of male brown scales are distinct on the under surface of the left hind-wing, lying respectively along the inner margin, in area 3 along vein 3, and in area 5 along vein 5—all clearly shown in Pl. III, fig. 2. The upper surface of the hind-wings shows yellow scales in one or more of the marginal and submarginal markings near the anal angle, more strongly marked on the right side; also many patches and streaks on the white markings of both sides, more feebly represented in the fore-wings; two small spots on the black margin in area 4 of the right hind-wing, and a streak below the costa of the left fore-wing—these features mostly unrecognisable on Pl. II.

C (Pls. II and III, fig. 3).—Emerged 17 April. This female has a much fuller admixture on both surfaces of all wings, being especially strong in the left hind-wing and right fore-wing. The fluorescent yellow scales of the upper surface of the latter and the under surface of the fore-wings are distinctly indicated in the figures by a shade similar to that of the yellow ground-colour of Pl. II, fig. 4. The male brown and buff of the hind-wings under surface is clearly represented in Pl. III, fig. 3. The left tail is about half the length of that in the normal male, the right tail a small but distinct trace.

D.—This female, of the form *lamborni*, Poult., with strong male admixture in all wings except the left hind, was one of a most interesting " Family 65:1923," bred from the eggs of a *planemoides-mixtus* female, captured by Canon K. St. Aubyn Rogers in N'gong Forest, near Nairobi. The male admixture consists of

narrow and broad streaks and large patches of fluorescent yellow scales, chiefly overspreading the orange-brown parts of the pattern, but also present on the black of the fore-wings, especially on the right side. The under surface admixture is also very strong on the fore-wings, but here mainly on the left. The larvae of this family had suffered from infection, probably bacterial, and this specimen as well as some others has expanded imperfectly. Furthermore, as a probable direct or indirect result, the yellow elements in the pattern of *lamborni* (the subapical bar of the fore-wing and submarginal spots of the hind)—fluorescent like the male in normal examples of this female form—have for the most part changed to a dull ochreous tint while the yellow male admixture has only darkened over a small proportion of its extent. The other female members of the family included 2 *lamborni*, 2 *mixtus*, Auriv., 1 *planemoides*, Trim., 1 *planemoides-mixtus* like the parent, 1 *leighi*, and 1 form of *cenea*. Dr. van Someren also records 14 males, of which I have seen eleven. He believes that the shock given to D was caused by the fall of the pupa.

Males E to I which exhibit a female admixture.—E and F are from the Nairobi district; G, H, and I from Uganda.

E (Pl. II, fig. 4).—From "Family 16:1923." The single male subjected to experiment in this family exhibits very slight traces of female (*hippocoon*) characters in the form of slender black streaks in the right fore-wing cell upper surface, prolonged into areas 6, 8, and 9; and, associated with these streaks, small patches of white scales unrecognisable on Pl. II, fig. 4. These characters are not repeated on the under surface of the wing. There is also in area 6 a white-streaked prolongation of the yellow ground-colour into the black margin. This modification of the pattern probably represents an approach to the outline of the oblique, white fore-wing bar of *hippocoon*. In other respects, this male, the 29th butterfly to emerge, resembles the 18 others in the same family. The female parent was the form *mixtus*, Auriv., taken at Nairobi, 16 March, 1923, and its female offspring were 6 *mixtus* and 7 *hippocoon*.

F (Pl. II, fig. 5).—From "Family 46:1923." The single male subjected to experiment was the eleventh butterfly to emerge out of the 123 offspring of a *lamborni* female, taken *in coitu* 12 May, 1923, at Nairobi. There is unfortunately some slight doubt about the specimen, which bears a label "46.K" similar, except for the letter, to that borne by all other members of the family. Turning to the careful register kept by Dr. van Someren, every other entry corresponds with the label, the sex and, if a female, the form, of the corresponding specimen. Under K, however, "♂" had been first written but then erased and "♀" substituted together with the form-name "*mixtus*." No such ♀ bearing "K" was found, but only this male which exhibits a strong admixture of female orange-brown colouring (that of *mixtus* and some other forms) on the upper surface of the right hind-wing, in which also all but a minute trace of the tail has been lost and the submarginal pale markings reduced to a size very similar to that of the female, although the great majority of them remain fluorescent. Only opposite the root of the vestigial tail do these markings show a very slight approach to those of the male. The orange-brown female colouring is in the form

of two long broad streaks and a short intermediate streak, occupying together nearly one-third of the basal yellow surface, and prolonged slightly but distinctly on to the broad black margin. The pattern and colouring of the under surface are male, as in the left hind-wing.

The constitution of the family—the largest and most remarkable family of *dardanus* ever bred from a known female *—supports the conclusion that this gynandromorph is the "K" of the register. The other 122 offspring are as follows :—

Males	57
Cenea females	8
Lamborni females	10
Hippocoon females	19
Orange-brown-marked females	28
Total	122

The orange-brown-marked females, in addition to *lamborni*, included *mixtus*, *niobe*, Auriv., forms approaching *dorippoides*, Trim., and other transitional varieties, all with colour such as appears on the right hind-wing of K.

There is, however, another important character in which K differs from the other 57 males and also from the male parent, viz. the continuity and immense breadth of the black discal band of *both* hind-wings, a band which is such as we should expect to find on a male of the *tibullus* race from the E. coast. If K is really a member of Family 46, and, considering the whole of the evidence, I believe that it is, then the effect of the shock has been not only gynandromorphism, but also the calling up of a probably recent pattern which existed potentially in the genetic constitution of the family, but would otherwise have been hidden.

It may be significant that the right hind-wing with the female admixture, is somewhat crumpled and imperfectly expanded (cf. H and I).

The three remaining gynandromorphs are the offspring of female parents captured near Jinja on the N. shore of the Victoria Nyanza. The dates are not available but certainly lie between 1923 and 1925.

G (Pl. II, fig. 6).—A rather dwarfed male with the family label "4.N." The female admixture, mainly of black streaks, but also of associated patches of white scales, is nearly confined to the fore-wings and strongest on the right upper and left lower surfaces. The female form represented is clearly *hippocoon*. A black streak from the base to the apex of the cell on both fore-wings is broken by a gap filled with white scales corresponding to the position of the white cellular mark of this female form, which is similarly indicated on the under surface of the left wing. The narrow outer end of the subapical spot on both fore-wings

* In addition to the above, Dr. V. G. L. van Someren bred in 1923 another nearly equally large family from the eggs of a female parent of the same form *lamborni*, also from Nairobi. The two parents differ slightly but distinctly in pattern, and the differences appear in their respective *lamborni* offspring—an excellent example of the formerly disputed transmission of small variations.

is yellow and fluorescent, the inner broader section, non-fluorescent *hippocoon* white. The distinction between white and yellow is generally clear in Pl. II, fig. 6, where, however, a large hole in the left fore-wing must not be mistaken for a white patch. The pattern of the hind-wings, except for three dark dots in area 3 and two small dark marks in and near the apex of the cell, in the left hind-wing, is that of a typical Uganda male of *P. dardanus dardanus*.

H (Pl. II, fig. 7; Pl. III, fig. 4).—This male, also shown by the pattern of the left hind-wing to be the typical Uganda form, bears the family label "1.N." A photograph of the family, in which, however, only one other male is represented, was kindly sent by Dr. V. van Someren and shows that the female parent was a form of *niobe*, while the female offspring (probably the whole) included 5 *hippocoon*, 6 *planemoides*, Trim., and 1 form of *niobe* differing somewhat in pattern from the parent.

The female admixture is *hippocoon*, so strongly developed on the right side and so little on the left that the specimen approaches a complete half-and-half gynandromorph. The left hind-wing, as implied above, shows almost no admixture; the left fore-wing a considerable development of black streaks and white patches in and beyond the cell on the upper surface; below, only two slender black streaks. The broad costal streak is breached as in G, the gap being mostly filled with white scales on the left, entirely on the right. The pale ground-colour of the left fore-wing invades the black margin in area 6 as described in E, but to a greater extent. The distinction between male yellow and female white is clearly shown in the figures.

Dr. van Someren informed me that the pupa of this butterfly, as well as that of I, fell at the soft, sensitive stage when it is susceptible to shock. It is uncertain whether this fall was the only shock (see p. 82) or whether the cage was knocked as in the other experiments. In both examples, however, the fore-wing of the side which has become female exhibits a similar deformity, caused by the inability to expand normally—H in the region of vein 3 and area 2; I in that of area 3. As a result of this inability, the wings are indented by a deep bay opposite these points, a deformity which is more pronounced in the following specimen.

I (Pl. II, fig. 8).—This specimen is, in pattern, form of wings, and even in the colour of the body, a complete half-and-half gynandromorph. The external armature, much reduced but still male on the left (female) side, alone serves to show that, but for the shock, it would have been a male. The label is "3.M." and a photograph shows that the female parent was *planemoides*, that two of the male offspring were the Uganda race like the right wings of I, and that the female offspring included 10 *hippocoon*, and 8 *planemoides*. The left wings of I, however, are a form of *leighi*, Poult., closely related to *planemoides*, but with the orange-brown of the fore-wing broken up and the basal area of the hind-wing orange-ochreous instead of white. The pattern of the fore-wings in some of the *planemoides* offspring appears to be modified in the direction of I. The deformity of the left fore-wing has been described under H.

Explanation of Plate II.

All the figures are rather over half the natural size. Eight of the nine shock-produced gynandromorphs of *Papilio dardanus*.

Fig. 1.—Ex. A. This and the next two figures represent females with male admixture in a family from the Nairobi district. This *cenea* female exhibits a minute trace of male yellow represented within a white line on the R. fore- and L. hind-wings. The yellow male scales, strengthened with white body-colour on the print from which the plate was taken, are brilliantly fluorescent in ultra-violet light—an effect intended to be suggested by the special treatment, not accorded to the male scales represented in other figures. The area occupied by the male scales is somewhat smaller than that shown in the figure. The under surface of this female is represented on Pl. III, fig. 1.

Fig. 2.—Ex. B. A *hippocoon* female from the same family as fig. 1. The rudimentary tail on the R. hind-wing is an obvious male character, but unfortunately the numerous patches and streaks of yellow male scales on the white markings are unrecognisable. The spot below the costa forming a continuation of the oblique fore-wing bar on the left side and shown as of a darker shade than the rest of the marking represents a patch of fluorescent yellow scales. The darker shade of an area on the white basal patch nearest to the rudimentary tail is due to the effect of the dark male pattern on the under surface. Compare Pl. III, fig. 2.

Fig. 3.—Ex. C. Another *hippocoon* female from the same family as figs. 1 and 2. Here tails are present on both sides, that on the left being about half the usual length and exhibiting the usual male pattern. The large admixture of yellow male scales on the white part of the pattern is unfortunately unrecognisable, but is clearly indicated by the grey markings of the R. fore-wing, and two spots in the black marginal area of the R. hind-wing. The large mark at the root of the left tail is part of the male pattern (as may be seen by comparing fig. 4) and is brilliantly fluorescent. The under surface represented in Pl. III, fig. 3, no less than the upper, shows a male admixture chiefly developed in the R. fore-wing and L. hind-wing.

The remaining figures, 4–8, represent males with female admixture progressively increasing in amount up to fig. 8, which is in pattern a complete half-and-half gynandromorph. Each belongs to a separate family, 4 and 5 from the eggs of Nairobi parents; 6, 7, and 8 from parents taken at Jinja, Uganda. In each of these five males the admixture is of a particular female form and never a combination of two or more forms. In each, except the butterfly represented in fig. 6, the gynandromorph is known to be a member of a family in which the corresponding female form or one closely related to it, is represented.

Fig. 4.—Ex. E. The very slight female admixture is restricted to the upper surface of the R. fore-wing in which the costal border of the yellow ground-colour is invaded by dots and streaks of *hippocoon* black, and between them small patches of white scales not recognisable in the figure. One of these patches clearly represents the white mark in the cell of this female form. White scales are also present in the projection of the ground-colour into the black margin, which, like the similar feature in the L. fore-wing of fig. 7, represents an approach towards the outline of the oblique white bar of *hippocoon*, as is clearly seen when the R. and L. sides of fig. 7 are compared.

Fig. 5.—Ex. F. The strong female admixture is confined to the R. hind-wing which retains only a faint trace of a tail, and exhibits, on the upper surface only, a female submarginal pattern, and broad streaks of orange-brown running through the basal yellow patch and prolonged into the greatly developed black discal band. This latter, also highly developed on the L. side, is unlike the other male offspring in the same family and also unlike the male parent. This feature may be due to reversion caused by shock, but there is unfortunately some little doubt about the data from which the identity of the family has been inferred. The female form represented in fig. 5 is one of the series with orange-brown hind-wings of which there were many in the family to which this specimen is believed to belong. The R. hind-wing is somewhat incompletely expanded—a possible indication that the gynandromorphism has appeared in the part most strongly affected by shock.

Fig. 6.—Ex. G. This somewhat dwarfed male exhibits on the upper surface of both fore-wings a scattered admixture of black and white streaks and patches of the *hippocoon* form. The outer narrow section of the pale subapical spot on both sides remains yellow and fluorescent, the broad inner section white and non-fluorescent. The white patch interrupting the continuity of the black streak below the costa is shown, by comparison with figs. 7 and 2, to represent the white mark in the cell of *hippocoon*. The apparent white mark extending into the black margin on the left side is due to a hole in the wing. A considerable admixture of *hippocoon* black also appears on the under surface of the L. fore-wing, an important streak in the cell showing through on the upper surface and appearing as a grey stripe in the figure.

Fig. 7.—Ex. H. This specimen approaches a complete half-and-half gynandromorph. There is, however, a considerable admixture of *hippocoon* black and white on the L. fore-wing and of male fluorescent yellow on the R. wings. Nevertheless, in the pattern as a whole and in the absence of a tail, the R. side is clearly *hippocoon*. The similarly deformed contour of the R. fore-wing and the L. of fig. 8 may be due to the shock specially affecting the part of the pupa pressed by the girdle, and may also indicate that the characters of the opposite sex tend to appear on the side which is chiefly affected. The under surface of H. is represented on Pl. III, fig. 4.

Fig. 8.—Ex. I. In pattern this is a complete half-and-half gynandromorph, the female form being *leighi*. The specimen is inferred to be a male with female admixture because the external male armature is present, although reduced in size, on the female side.

Alfred Robinson, photo. *Vaus & Crampton, Ltd.*

Rather over half natural size.

Shock-produced gynandromorphs of PAPILIO DARDANUS.

Figs. 1-3 females with male admixture; figs. 4-8 males with female admixture.

Explanation of Plate III.

All the figures are about three-fourths of the natural size.

Fig. 1.—Ex. A. The slight male admixture is restricted to the R. fore-wing in which the fluorescent yellow markings are indicated by an enclosing white line. The markings themselves have not been emphasised with white body-colour as in the representation of the upper surface (Pl. II, fig. 1), and are recognisable by their greyish tone.

Fig. 2.—Ex. B. The male under surface pattern is very distinct in the section of the R. hind-wing bearing the rudimentary tail and also appears in the form of dark streaks bordering some of the veins in the L. hind-wing. A long streak of fluorescent yellow scales is conspicuous by its greyish shade on the black ground-colour of the L. fore-wing. Other much smaller patches of similar scales are unrecognisable in the figure.

Fig. 3.—Ex. C. The strong development of a male under surface pattern is very distinct especially on the left side with the longer tail; also the fluorescent scales represented by greyish streaks and patches on the R. fore-wing and to a much less extent on the L.

Fig. 4.—Ex. H. The left wings are—except for the effect of the upper surface streaks of the fore-wing showing through, and the presence of two slender black streaks superposed on these features—those of a male under surface, a pale and lightly marked form very different from the dark male pattern suggested by the hind-wings of figs. 2 and 3. On the R. or female side there is a considerable remnant of male fluorescent scales partially recognisable by a greyish tone similar to that of the pale ground-colour of the L. fore-wing.

Alfred Robinson, photo. *Vaus & Crampton, Ltd.*

About ¾ natural size.

Shock-produced gynandromorphs of PAPILIO DARDANUS.

Figs. 1-3 under surfaces of figs. 1-3 on plate II; fig. 4 under surface of fig 7.

APPENDIX II.

Gynandromorphs and Intersexes, by Dr. E. A. Cockayne, D.M., F.R.C.P.

It has been proved that gynandromorphs can arise in two different ways: (1) from a binucleate ovum each nucleus of which is fertilised by a different spermatozoon. In flies the spermatozoa must be unlike, one having an X and the other a Y chromosome, if the ovum is to produce a gynandromorph, but in Lepidoptera the nuclei of the ovum must differ, one having a Z and the other a W chromosome. (2) In Diptera, by the loss, during cell-division, of one X chromosome, turning an insect which would have been a female into a gynandromorph; or, in Lepidoptera, by the loss of one Z chromosome, turning an insect which would have been a male into a gynandromorph. A perfectly halved or almost perfectly halved gynandromorph would be produced from a binucleate ovum or from an ovum in which a chromosome was lost at the first cleavage. In such Lepidopterous gynandromorphs there may be a testis and an ovary or both gonads may be alike, but in Diptera the gonads are always alike, either testes or ovaries.

Gynandromorphs in which the secondary sexual characters are distributed in an irregular and often unequal manner on both sides of the insect or in which those of one sex occupy a much larger area than those of the other sex, may arise by the loss of a sex chromosome during the division of one or more cells at a later stage of development. I do not think these can be distinguished from some intersexes by any means except cytological examination.

Intersexes arise in various ways and differ in external appearance and internal structure. In some there is a coarse mosaic resembling that of a gynandromorph; in others the mosaic is fine or there is so intimate a blend that the insect appears intermediate, especially in the structure of its antennae and external genitalia. The gonads may be testes, ovaries or ovotestes, and the testes or ovaries may be rudimentary or well-formed and functionally active. In some cases intersexuality is inherited in Mendelian proportions.

There is some experimental evidence that gynandromorphs and intersexes can be produced by physical stimuli acting from without. Mavor obtained 2 out of 2883, by subjecting females of *Drosophila* to X-rays; also 2 out of 24,467, by subjecting female pupae to X-rays. In an equal number of controls there were none. The action was indirect because in two cases the chromosome eliminated was a paternal one which had not been exposed to irradiation. The probability is 20 to 1 that the treatment produced the gynandromorphs.

Kosminsky claims that he produced intersexes of *Stilpnotia salicis* by keeping the pupae at a temperature of 30° C. for thirty days. He also produced intersexes of *Lymantria dispar* by keeping larvae in the third instar at a temperature of 30°–35° C. The males and females were small and only two fertile pairings were obtained, one giving 5 intersexes out of 11 moths and the other 7 out of 32. These proved to have triploid chromosomes, a condition which is the cause of the intersexuality in some secondary hybrids and in a mutation of *Drosophila*. A mechanical shock could not produce this chromosome disturbance nor could it cause gynandro-

morphism at a late stage of development, but I suppose it could act in the same way as cold, although I do not understand what this action is.

There are many more records of gynandromorphs in Lepidoptera than in other orders, but I am doubtful whether they are really commoner. They are much more conspicuous in butterflies and moths and there are many more collectors interested in them. In species in which sexual dimorphism is slight few have been noticed. They are much commoner in some species of Lepidoptera than in others, for instance in *Amorpha populi*. Probably binucleate ova are commoner in some species, and, if so, this might account for the difference, if not wholly at any rate in part. External conditions may be more favourable to their production in some species than in others. In some cultures of *Drosophila* numbering more than 60,000 the proportion of gynandromorphs was about one in 2000, but in others none were met with amongst more than 20,000. Most of these gynandromorphs of *Drosophila* were proved not to have arisen from binucleate ova, so that, apart from this cause, the percentage must be a variable one even in the same species. It is impossible on the data available to say whether the difference in frequency in Lepidoptera and other orders is actual or apparent.

APPENDIX III.

Gynandromorphism in Ants, by H. St. J. K. Donisthorpe, F.Z.S.

Forty-eight gynandromorphs have been described (1851–1924) in ants, eleven of them being British records. They include all combinations of a female form with male—queen-male (gynandromorph), worker-male (ergatandromorph), and soldier-male (dinergatandromorph). The combination may be half-and-half longitudinally, or transversely, or in patches (mosaics). It may also be incomplete—a very small part one sex and the rest the other. A combination of male, female, and worker is also known. Professor Wheeler * considers that the existence of a dinergatandromorph proves that the worker and soldier forms are predetermined in the egg. My own experience is opposed to this conclusion, for a colony of *Myrmecina*, under observation for 15 years, always produced winged females except in two years when no food was provided in the winter. Furthermore, the production of pseudogynes and the existence of a complete series of intermediates between perfect females and ordinary workers strongly support the hypothesis of a trophic rather than a germinal cause of the different females castes.

Professor W. M. Wheeler suggests † that the possible cause of gynandromorphism in ants may be one of the following :—

1. A gynandromorph may, perhaps, arise from two eggs which have fused to form a single egg with two nuclei. These eggs may originally have been of different sex, or may have become different through the non-fertilisation of one and the fertilisation of the other.

2. It is possible that the nucleus of a single egg may either undergo cleavage

* *Psyche*, **26**, 7–8 (1919). Wheeler here describes the only known example of the soldier-male combination.

† *Bull. Amer. Mus. Nat. Hist.*, **19**, 681 (1903).

prematurely or receive the spermatozoa too late, so that, in cases of polyspermy, so general in insects, the resulting cleavage nuclei may unite with different sperm-nuclei, or in part develop parthenogenetically and in part after fertilisation.

3. It is conceivable that the somatic peculiarities, at least of unisexual gynandromorphs, may be the result of trophic disturbances during the post-embryonic, *i.e.* larval or pupal, development. These disturbances may, perhaps, be analogous to those which cause viragoism, etc., in other animals and may depend on pathological changes in the chromosomal condition of certain tissues.

Professor Wheeler puts forward these suppositions as working hypotheses and maintains that we can have no real understanding of gynandromorphism until it can be produced experimentally.

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